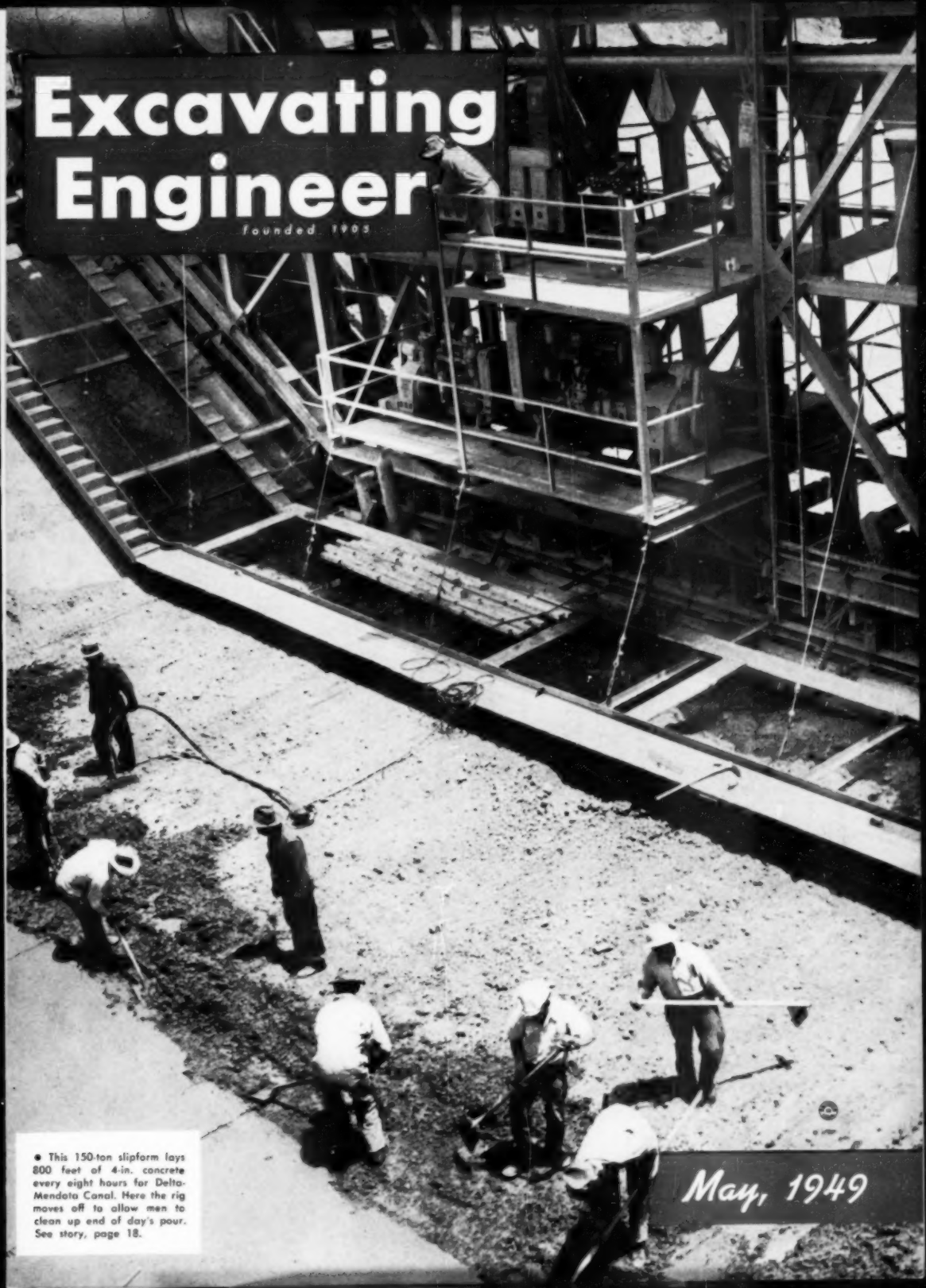
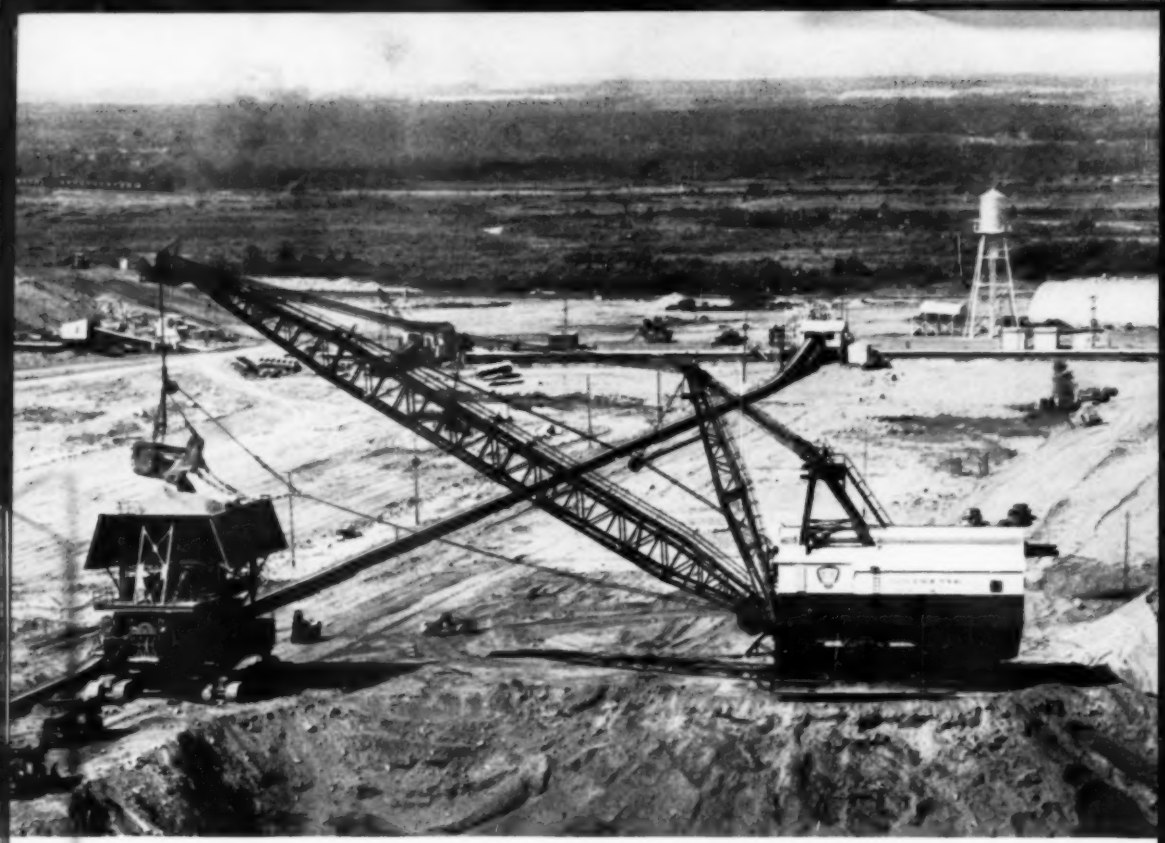
Excavating Engineer

founded 1905



• This 150-ton slipform lays 800 feet of 4-in. concrete every eight hours for Delta-Mendota Canal. Here the rig moves off to allow men to clean up end of day's pour. See story, page 18.

May, 1949



The Dragline with the Boardinghouse Reach

Loading to a portable screening plant which feeds nearly two miles of conveyor belting, a Bucyrus-Erie 1150-B walking dragline is the key machine in an unusual stripping operation on the Iron Range. The 1150-B's "boardinghouse reach", with a 30-yd. bucket on a 180-ft. boom, contributes the great range and capacity needed. Responsive Ward-Leonard variable voltage rotating control gives it the precise, fast operation that matches high efficiency with low operating costs. The 1150-B's simple, dependable walking mechanism, with its smoothly efficient action, combines with sturdy construction and advanced design to assure a long lifetime of profitable service. Those are a few of the reasons why the 1150-B is able to move vast quantities of overburden so economically — and why it was chosen for this unique operation on the Mesabi. For the solution of your stripping problems, Bucyrus-Erie offers walking draglines in all sizes.

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

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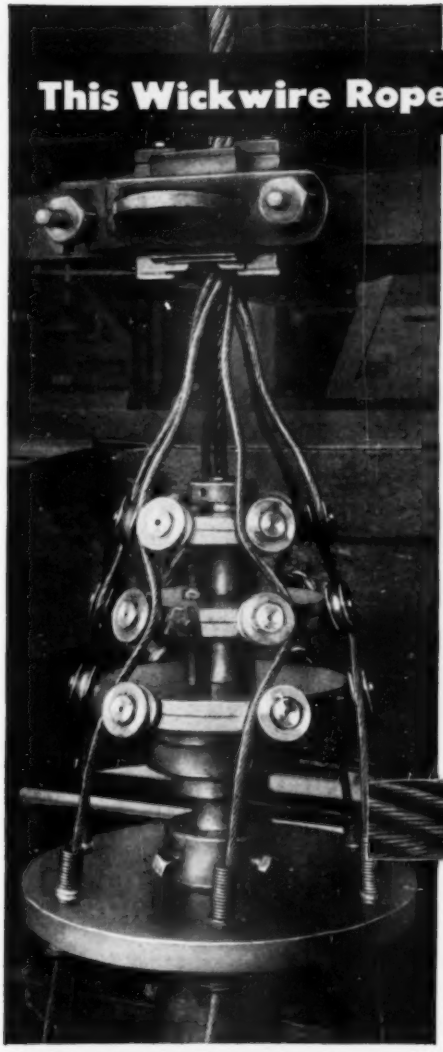
The Best Buy Bucyrus . . . The Best Buy In Excavators

This Wickwire Rope Gets a Permanent Wave



Passing strands of Wickwire Rope through a special roller head causes them to set in a wave-like pattern. The result is WISSCOLAY *Pre*formed—a rope that not only lasts longer than non-preformed rope, but is kink-resistant; easier to cut, splice and install, and safer to handle.

Before any order of WISSCOLAY *Pre*formed is run off, samples are subjected to several tests—most important of which is the Strand Helix Test. Individual strands are placed between the plates of the testing apparatus and checked with a micrometer. These tests are made by inspectors whose approval demands that the helix diameter be controlled within the closest of tolerances in meeting the specified standard.

This and countless other tough tests, coupled with over 125 years of wire-working know-how, make Wickwire Rope the logical choice of rope users who demand the utmost in performance, safety and long life.

Wickwire Distributors and Wire Rope Engineers in key cities everywhere are ready to help solve your wire rope problems and to provide prompt delivery of the rope you need. Wickwire Rope is available in all sizes and constructions—both regular lay and WISSCOLAY *Pre*formed.

THIS 82-PAGE BOOK ON WIRE ROPE IS FREE.
WRITE FOR YOUR COPY TODAY!

Thousands of wire rope users have found that the information packed in the pages of "Know Your Ropes" has made their work easier. It's full of suggestions on proper selection, application and usage of wire rope. It's easy-to-read and profusely illustrated. For your free copy, write—Wire Rope Sales Office, Wickwire Spencer Steel, Palmer, Massachusetts.

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A PRODUCT OF THE WICKWIRE SPENCER STEEL DIVISION OF THE COLORADO FUEL AND IRON CORPORATION

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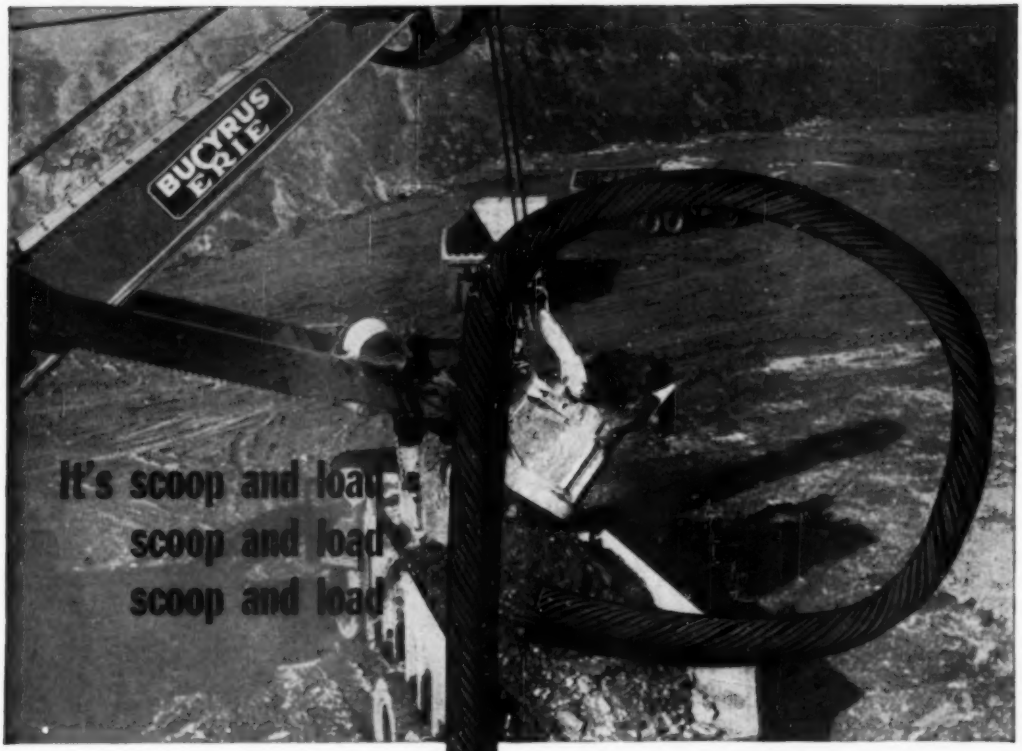

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You keep a fast-moving procession of trucks under your shovels when you blast with Primacord. Because Primacord works to produce the kind of well-broken ground that makes digging much easier.

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A non-conductor, Primacord is insensitive to stray currents, comes wound on light-weight spools in three different grades. Ask your explosives supplier which you should use . . . or write us direct.

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P-22

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Excavating Engineer

founded 1905

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Electrically

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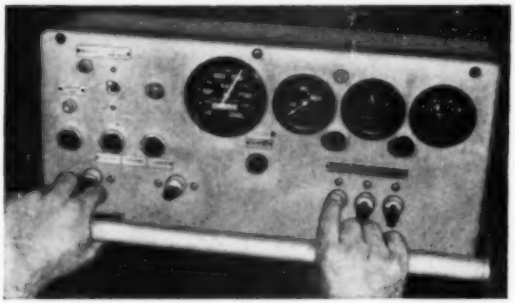
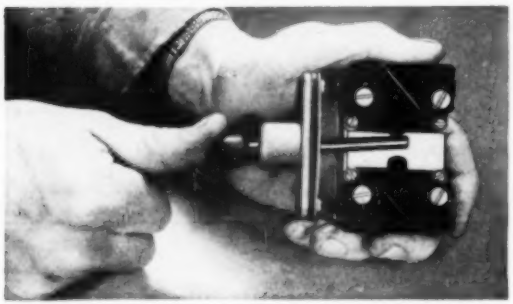


Control panel of LeTourneau's Model "C" Tournapull; a fingertip movement instantly applies power to motors which steer the vehicle, operate hoist, apron or tailgate.



Two General Electric switchettes make up switch assembly on control panel, above. Other G-E switches limit travel on steer, hoist, apron and tailgate motions by cutting power at the proper instant, eliminating stresses and strains.

The trend toward electrification of construction equipment has even invaded the mobile-tool market; witness the giant earth mover with electric power-steer and electrically operated hoist, apron and tailgate. Contractors using this new tool will move more yards per day at lower cost per yard because the electric drive offers fast, accurate, effortless control. This means instant response, quick reversal, increased operator comfort and efficiency. Gone are the multiple, clumsy manual controls and many mechanical linkages which slowed operations and increased maintenance costs.

Ask him Today!

Electric drive, which offers the maximum in reliability with minimum maintenance, helps contractors build more for less . . . faster. Whether you build or use construction tools, ask your General Electric representative to tell you about the inherent advantages of electric drive. *Apparatus Department, General Electric Company, Schenectady, N. Y.*

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LOWER COST

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NORTHWEST
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You may find sometimes that Bethlehem wire rope is a bit higher in first cost than some other brand; but on the basis of long-range economy — *true* economy — we invite you to compare it with anybody's product, any place, any time.

Bethlehem has one of the finest, most modern rope mills in the world; a staff of engineers whose sole object is to build longer life and better service into Bethlehem ropes; and a field organization whose job is to study rope trends and rope uses in every industry. All this adds up to one thing — quality; the type of quality that in wire rope means Lower Cost per Unit of Work.

And that's the only real yardstick — the only *real* measure of economy.

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BETHLEHEM, PA.

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"Wayne Crane MOBILITY Has Increased Our Profits"

. . . says W. B. Jauert, Wapakoneta, Ohio, Drainage Contractor

"With our Model 22 Wayne Crane we are operating profitably on difficult locations where we couldn't have taken the heavier, less mobile equipment it replaced. This machine's rubber-tired mobility and traction are getting us to and through more jobs than ever before. We've operated our Wayne Crane as a trench hoe and dragline for 21 months at low cost and with a minimum of repair. It's been a real profit-maker for us."

MODEL 22 WAYNE CRANE TRENCH HOE

ILLUSTRATION — Jauert operator, Vernon Henry, digging a feeder ditch at New Knoxville, Ohio, with a Model 22 Wayne Crane trench hoe.

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½-Yard, 10-Ton Capacity

Owners from coast to coast say the same:

"Wayne Crane is a money-maker because it does more jobs better and faster."

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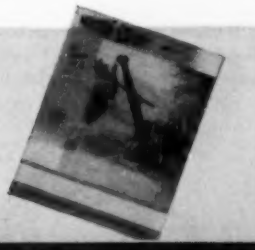

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HOW TO GET THE MOST GOOD

Obviously each company benefits in proportion to the percentage of its employees who participate in the Plan. Nation-wide experience indicates that 50% of the employees in your company can be persuaded to participate *without high-pressure selling*. Here are five steps which have proved to be the "magic formula" for putting over the Plan. They will get results for you:

1. See that a top management man sponsors the Plan.

2. Secure the help of your employee organizations in promoting it.

3. Adequately use posters and leaflets and run stories and editorials in company publications to inform employees of the Plan's benefits to them.

4. Make a person-to-person canvass, once a year, to sign up participants.

These first four steps should win you 40-60% participation. Normal employee turnover necessitates one more step:

5. Urge each new employee, at the time he is hired, to sign up.

Check up on the Payroll Savings Plan in your company. If fewer than half of your employees are participating, you have a lot to gain by following the five-step program outlined here. All the help you need is available from your State Director, U. S. Treasury Department, Savings Bonds Division. While it's on your mind, why not call him right now? Or write the Treasury Department, Washington 25, D. C.

The Treasury Department acknowledges with appreciation the publication of this message by

Excavating Engineer

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on any of the four sizes of Payloaders: the 10½ cu. ft. Model HA; the ¾ yd. Model HF; the 1¼ yd. Model HL; the 1½ yd. 4-wheel drive Model HM.

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Reduce air consumption at least 40%
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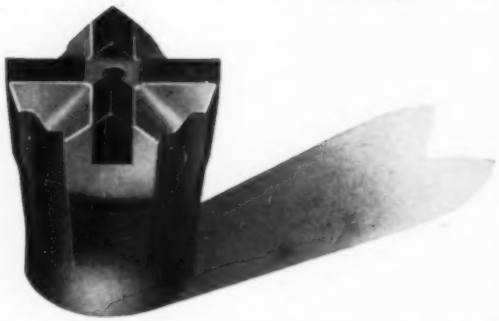
Save up to 30% on dynamite



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The performance and economy of Ingersoll-Rand's revolutionary CARSET JACKBIT are now a matter of record – proved by more than two years of actual field experience on all types of mining, quarrying and construction jobs.

This super-Jackbit set with Carboloy inserts, drills from 50 to 400 times as many feet of hole as the best steel bits available – with no appreciable gauge wear! It permits drilling of smaller, uniform-diameter holes to any practical depth, without binding and without bit changes. The elimination of tapered holes saves up to 30% on dynamite alone. And because it drills so much faster and easier, even in the hardest rock, the CARSET JACKBIT reduces air consumption per foot of hole 40% or more, and saves as much as 30% on drill maintenance. No wonder rock-drill men call it "The greatest single advance in rock drilling since the invention of the Jackhamer."

For the complete story on the CARSET JACKBIT, write today for your copy of our new 36-page, pocket-size catalog, Form 4091.

HERE ARE A FEW TYPICAL REPORTS ON CARSET PERFORMANCE

ON A LARGE QUARRY JOB, drilling in hard trap rock with 45-lb. Jackhamers, steel bits dulled so quickly that they required 4 to 6 bits for a 2-ft. change – also the strain of forcing dulled bits caused excessive rod breakage. CARSET JACKBITS, now being used, are averaging 300 feet per bit. Rod life has been greatly increased and drill maintenance materially reduced.

ON A LARGE DAM PROJECT, 2" CARSET JACKBITS were used with 4" Wagon drills operating in hard dense basalt. These bits drilled 24-ft. holes in 22 minutes, while steel bits previously used required 66 minutes for an 18-ft. hole (with 10 bit changes). Footage was increased from 120 to 261 feet per shift. The contractor says "If I'd had CARSET JACKBITS at the beginning of the job, I'd have saved $75,000 to $100,000."

IN DRILLING LARGE BOULDERS, for blasting in an open pit operation, Jackhamer operators increased drilling speed from 4 inches per minute with steel bits to 10 inches per minute with CARSET JACKBITS. This combination of higher drilling speed and the saving of time previously lost changing bits, permitted them to complete 60% more plug holes per day.

A MINING COMPANY, drove 223 feet of 8 x 8 cross-cut in typical siliceous rock with 3" drifters and 1½" CARSET JACKBITS. Eighteen bits were used, averaging over 300 feet per bit. By drilling small uniform diameter holes with CARSET JACKBITS, they saved 8 pounds of dynamite per foot of advance, or total of $223. – which more than paid for the cost of the CARSET JACKBITS!

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Smooth going on a rocky road

It takes a shovel with rugged dependability to make profitable headway on a rock cut like this. That's why the machine on the job is a Bucyrus-Erie 54-B, for the 2½-yd. 54-B combines big-shovel strength, power and durability with small-shovel speed and efficiency. The result is more passes per shift, more cubic yards of dirt or rock moved every hour, more profits on your excavating contracts.

You can't go wrong by following the choice of the nation's top contractors, for their experience has proved the dependability, efficiency and economy of Bucyrus-Eries. See them in action for yourself, then see your Bucyrus-Erie distributor for more information on the ⅜- to 2½-yd. line.

BUCYRUS ERIE

The BEST buy Bucyrus, the best BUY in excavators

Bucyrus-Erie Company
South Milwaukee, Wisconsin

Hanna uses high- for clean-up

Works with 40-yard stripping shovel

Hanna Coal Company makes good use of the high speed and mobility of the rubber-tired Tournadozer at their Georgetown mine #12 near Georgetown, Ohio. Tournadozer is used for clean-up around their 40-yard stripper, in addition to many other scattered job assignments around the pits. The shovel stripping operation, which consists of overcasting overburden of limestone and sandstone shales up to 85', is on a full-time, 24-hour-day, 7-day-week basis.

Mine Superintendent, Donald D. Saxton, says:

"This machine has many advantages as a clean-up tractor under large stripping shovels. It has adequate traction for the job . . . and its greatest advantage to a wide-spread operation, such as this, is its extreme mobility." Here's what the Tournadozer operators had to say:

From Operator Paul Thomas:

"It sure has lots of power and will handle big loads of rock. I have used it to make fills and drains, too. On

LET

LETOURNEAU
PEORIA, ILLINOIS

HIGH-SPEED RUBBER-TIRED

IT'S RUBBER THAT PUTS . .

speed TOURNADOZER and handyman in Ohio pit

the fills I moved way more dirt . . . made more passes and carried more dirt each pass."

From Operator John Dulkoski:

"It sure is easy to operate and powerful. It's fast and maneuverable around a shovel. I have no trouble pushing out a stalled truck. It's good for hauling a lowboy down highway. I went to get a big Bucyrus-Erie 44B shovel at another pit. It was about 8 miles and I made it in about ½ hour. I like the fast blade action. There's not much greasing to do either. The quick shift lets me get in and out under shovel faster — doesn't hold up the shovel."

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TOURNADOZERS

. . THE ACTION IN TRACTION

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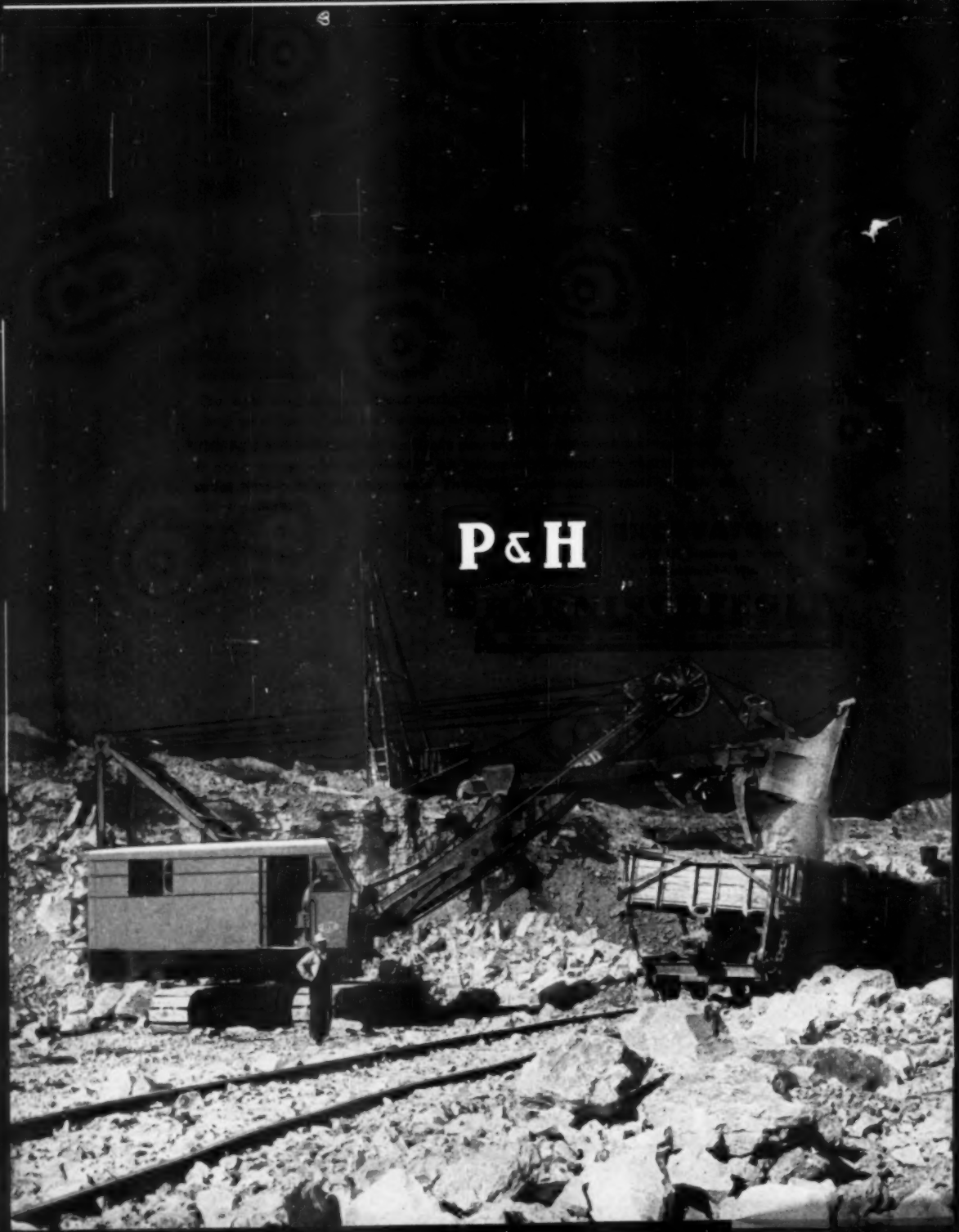

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1. A top-to-bottom curve, with the lower part of the cutting edge lying at a less steep angle than the top.

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Bucyrus-Erie 4-wheel scrapers get more pay dirt per yard of rated capacity than any other scrapers on the market. Tops among the reasons is the exclusive double-curve cutting edge which "boils" dirt up while it's being loaded, keeps it on the move, filling the scraper in the quickest, most efficient way.

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The resulting "boiling" action loads the scraper quickly, uniformly . . . it reduces chunks and voids, produces more pounds of dirt per cubic yard . . . it fills the scraper easily, requires less horsepower for loading.

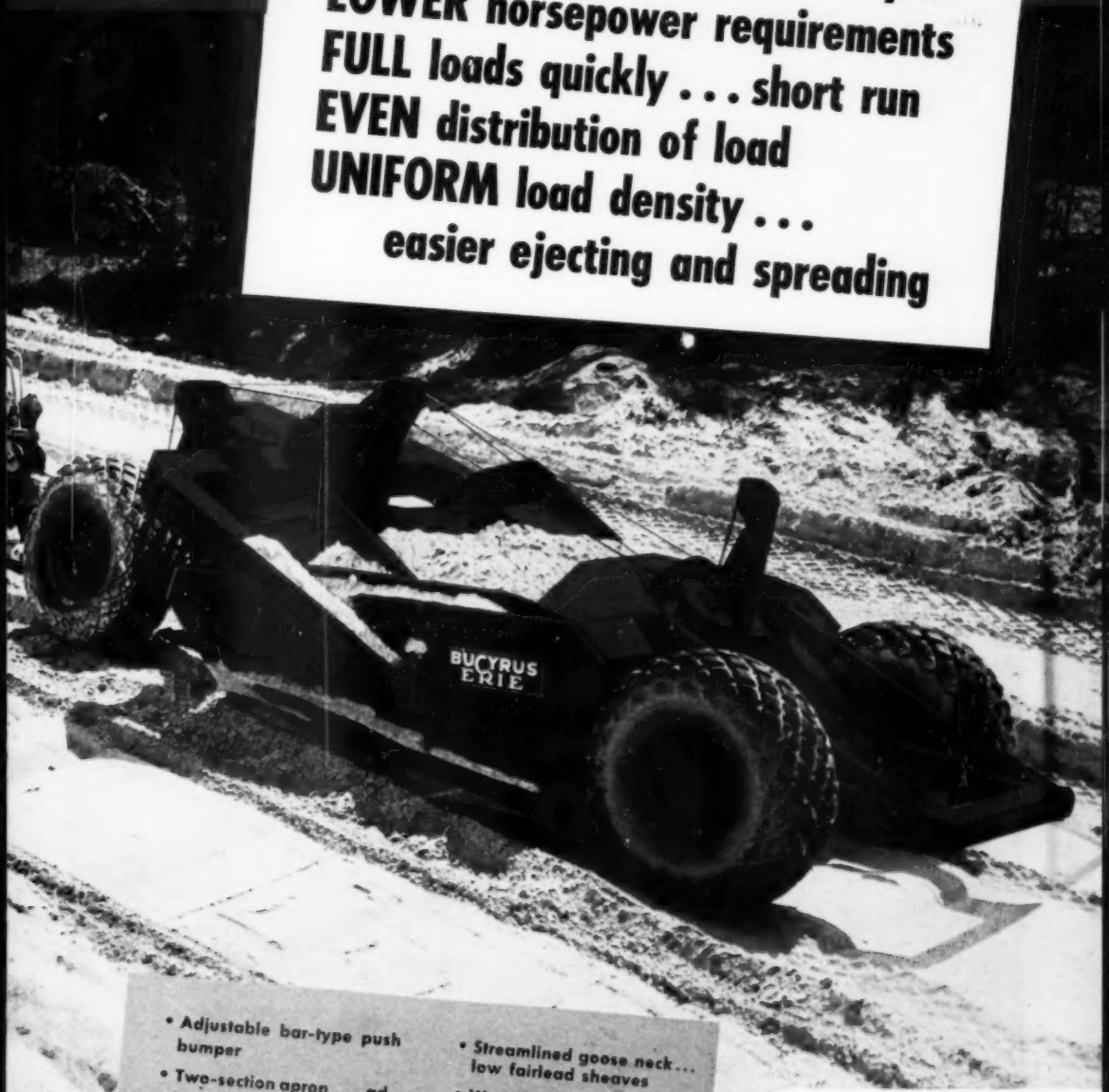
BUCYRUS-ERIE CO., South Milwaukee, Wisconsin

See Your INTERNATIONAL Industrial Tractor Distributor

BUCYRUS ERIE **4-WHEEL SCRAPERS**

Edge

MORE pounds of dirt per cu. yd.
LOWER horsepower requirements
FULL loads quickly . . . short run
EVEN distribution of load
UNIFORM load density . . .
easier ejecting and spreading



- Adjustable bar-type push bumper
- Two-section apron . . . adjustable to suit material
- Big single tires . . . same size all around
- Torque-rod bowl return
- Low center of gravity . . . great stability
- Streamlined goose neck . . . low fairlead sheaves
- Wedge-socket cable anchors
- Drop-center front axle
- Reversible side cutters
- Sliding-type bowl lock
- Double-disc drum-type wheels

B-Type: 15 and 22 cu. yd.

• Two endless dragbucket lines on this 150-ton canal trimmer scoop up excess dirt, dump into cross conveyors which discharge to main stacker conveyor, here spilling waste at side of canal.

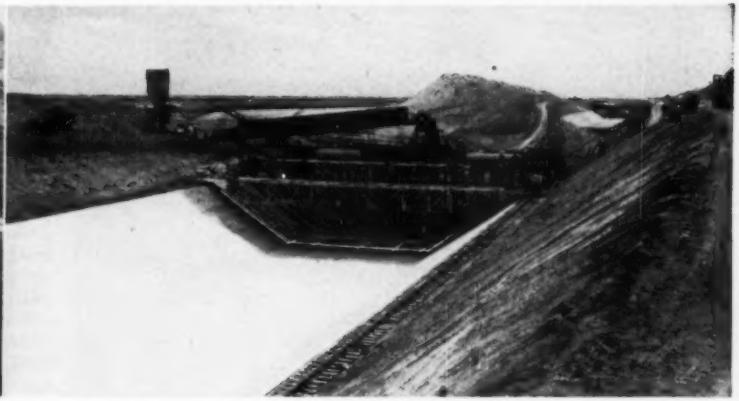
Nine Million Yards Closer to Mendota

Construction giants — a 15-yd. walking dragline, a special canal trimmer, paver and jumbos — are rapidly moving to conclusion Morrison-Knudsen Co., Inc., and M. H. Hasler contracts totalling $7½ million for the first 23 miles of Delta-Mendota Canal in California's Central Valley.

By Robert J. Green

• Entire 9-million-yd. excavation on the 23 miles is being accomplished by this 15-yd. Bucyrus-Erie 450-W walking dragline. Caterpillar 12 motor grader smooths canal bed behind walker.

• Above Left: Here slipform travels under its own power down 28% grade, across and up an 18% slope between sections of canal. Water will be carried under a river stream and highway at this point by 24-ft., 3-in. Mountain House siphon.



• Line-up of paving machinery shows curing jumbo following finisher and liner preparatory to crossing break in canal. Conveyor on top of liner carries cement mixed at side in Rex and Koehring drum pavers. Trimmer is ahead (in distance).

EIGHT MILES south of Tracy, Calif., men and machines are carving one of the world's biggest artificial canals in the vast Central Valley. The job is the renowned 120-mile long Delta-Mendota Canal, designed and engineered by the U. S. Bureau of Reclamation, at an estimated total cost of $70 million. The job, when completed many contracts hence, will send much-needed water to the west side of the San Joaquin Valley.

Morrison-Knudsen Co., Inc., and M. H. Hasler have been busy since Jan., 1947, on two contracts for 23.2 miles totalling $7,443,800. The machines drove hard to the finish line of the first contract in March, and many phases of the second job are underway. Nine million cu. yd. of excavation are called for in the two contracts.

Valley Water Shortage

The story of the water shortage in the San Joaquin Valley has been known ever since the first farmer settled there. Two rivers and the delta where they meet and flow on to the ocean form California's Central Valley. The Sacramento River forms a valley in the north; the San Joaquin flows through the south. The delta near Sacramento is the junction point of the 500-mile long basin. Sacramento Valley is shorter, has much less good farming land. It gets ⅔ of the valley's annual rainfall. In contrast, longer San Joaquin Valley with its better farmland gets only ⅓ of the rain.

For some years, farmers in the San Joaquin Valley augmented the natural supply of water from the San Joaquin River by deep wells. Heavy pumping over the years has dropped the underground water table to the danger point. Wells are beginning to go dry and farms are being abandoned.

Problem Partially Solved

To a certain degree the water shortage of the lower San Joaquin Valley is being taken care of. Friant Dam, in the last stages of construction on the San Joaquin River, holds water in Millerton Lake which feeds to Friant-Kern (160 miles long and almost half completed) and Madera (already in operation) Canals. Thus watershort lands to the south have a supplemental supply. However, this drains the San Joaquin River, taking water away from its northern reaches where it also serves a great deal of farmland.

Here the canal under construction comes in to transfer surplus water of the Sacramento River to the San Joaquin where it is needed. The Delta-Mendota system itself begins with the 35-mile long reservoir behind Shasta Dam (practically finished) on the Sacramento. This reservoir will eventually furnish a maximum of 5,000 acre-feet of water a day, through various routes, to Mendota Pool, 300 miles away, where the San Joaquin will pick it up.

Clear water will flow along the normal route of the Sacramento as far as

• Where the canal passes through low terrain, it had to be raised above the surrounding country ahead of the dragline. Here Caterpillar tractors—one with a LeTourneau dozer blade, another pulling a Wooldridge scraper and the other with a sheepsfoot roller, erect a low section.

• Above: Workmen place reinforcing steel while another section of 1,200-ft. Mountain House siphon is poured in background. Concrete forming and pouring jumbo is similar in function to liner used in main canal. Marion crane (rear) handled steel for the siphon structure, which was poured in alternate sections as shown.

• Left: A 2½-yd. Northwest 80-D dragline cuts out roadway detour where siphon will carry water up hill. (Same location as above)

• Below: In case of overflow in canal, this wasteway and drainage structure near siphon will act as safety valve to carry excess water away from canal. Caterpillar 12 motor grader maintains haul roads near culvert.

• Bottom: A Bay City 33 crane positions concrete bucket for pouring at culvert, here under construction.

the delta. Delta Cross Channel will then carry the water 50 miles to the powerful Tracy Pumping Plant (See *Excavating Engineer*, Dec., 1948, "Excavating for Central Valley's Heartbeat," page 20.) where 4,600 second feet of water will be lifted 200 feet to the Delta-Mendota Canal. The flow will continue by gravity through the canal to Mendota Pool, west of Fresno at the town of Mendota.

The man-made river will get smaller as its waters are fed through laterals to farmlands along its route. It will deliver at 3,200 cfs at the Pool, from which the San Joaquin will draw, regaining its normal flow. Thus the exchange of water—estimated at an average of 300 billion gallons annually—from one river basin to another is being accomplished.

Work on Second Contract

Work is now progressing on the first length of canal following the pumping plant. The job is at present moving ahead so rapidly that the second contract held by M-K-Hasler is expected to finish by the end of this year—one year ahead of schedule.

Building of 1,200 feet of 24-ft., 3-in. siphon—the Mountain House Siphon—was included in the first contract. A smaller siphon under a railroad, bridges where the canal crosses roadways, various inlet and outlet structures including triple box culverts under the canal were also part of the first contract.

In cross section, the big canal averages 18 feet deep from the top of its concrete lining to the bottom. It is 48 feet wide at the bottom with 1½:1 side slopes, dropping three inches per mile. Top width will be a maximum 102 feet.

One big piece of construction machinery is following another as this "river" is etched out of the countryside. A 15-yd. Bucyrus-Erie 450-W walking dragline is cutting the gigantic ditch. A special trimmer, tapered from its 110-ft. top to the 48-ft. canal bottom, follows, providing a neat, even grade. A specially built concrete paver is next in line, with finishing and curing jumbos just behind. Innovations on the job made it possible to move the trimmer and equipment following it around curves and over detours without dismantling.

One Machine Handles Excavation

The entire 9-million cu. yd. of excavation is being handled by the Bucyrus-Erie 450-W. Shipped in

pieces, the earthmoving giant required 41 days for assembly after it arrived on the job near Tracy in April, 1947. After it was complete, it walked under its own power to the canal location where it lowered its 200-ft. boom for the first 15-ton bite of clay.

Fitted with a 10-yd. Esco bucket when first assembled and then with a 13-yd. Esco for the heavy cuts in the first contract, the dragline had moved a million yards by early Nov., 1947. In the main, the roughest part of the earthwork was accomplished by that time, the dragline moving over 10,000 yards every 21-hour work day. With its boom shortened to 165 feet to handle a 15-yd. Esco, the big dirt-mover is now working on the second contract which passes through relatively flat country where the canal banks had to be built up several feet. The excavation here is only 15 feet deep. In the earlier contract the machine had to rip through cuts up to 67 feet deep to reach the canal floor grade.

Walker Averages 16,500 Yd. a Day

The machine is growling on day and night with remarkably little down time, averaging 22½ running hours out of every 24. An average day's progress nets 600 feet, or about 16,500 cu. yd. Powered by an 850-hp Cooper-Bessemer diesel engine, the dragline has electric and air controls. When the big bucket slices through the dirt leading up toward the fairlead sheave, the big diesel engine lowers its tone to a rumbling roar, but it never slows down. Three times a week a fuel truck from the Union Oil Co. drives to the rig and unloads about 800 gallons of high grade diesel fuel. Union also supplies lubricating oil and grease.

Tractor-scraper work which was done under a subcontract not only

• Top: Erecting the Bucyrus-Erie 450-W after its arrival on canal location. The walking dragline had 200-ft. boom, 10-yd. Esco bucket when first assembled.

• Above: Walker deposits a bucket of dirt on dump next to canal excavation. About 12 inches are left on side slopes and seven on bottom for removal by trimmer.

• Right: Caterpillar D-8 bulldozer with special curved blade dresses side slope before final cut by trimming machine.

• Below Left: Under subcontract, Condick Co., Berkeley, Calif., is putting down a total of 3,400 feet of rails to carry heavy paving equipment. Here Bay City Crane-Mobile positions a 39-ft. section.

• Below Right: Rolling along single tracks, 110 feet apart, trimmer removes from 1,000 to 2,500 yards daily.

finished the side levees, but also made a fairly smooth road ahead of the big walker. A Caterpillar D-8 dozer smooths down any irregularities in the path of the machine.

Little Gravel a Big Help

Digging is easy. Material is mostly clay with some sand. Here and there is a gravel pocket. The presence of occasional gravel particles is actually a help in canal excavation and makes a better looking finish job because the rounded particles permit the big bucket to slide down the side slopes. On a flatter slope, the bucket would probably not slide, according to the operator. One rule-of-thumb guide regarding the accuracy of his slope is the way the bucket acts while that part of the work is being roughed in.

Operators on the huge rig have developed unusual dexterity in digging a block of canal dirt. They first dig out the corners of a cut which shape the side slope of the canal. Starting at the top, the big bucket is made to slide down the slope toward the canal grade line at the bottom. First one side is dug, casting the material over to that side of the canal. Dump limits are marked every 50 feet.

Then the machine repeats the process on the opposite corner. With that done, a center block of dirt, known as

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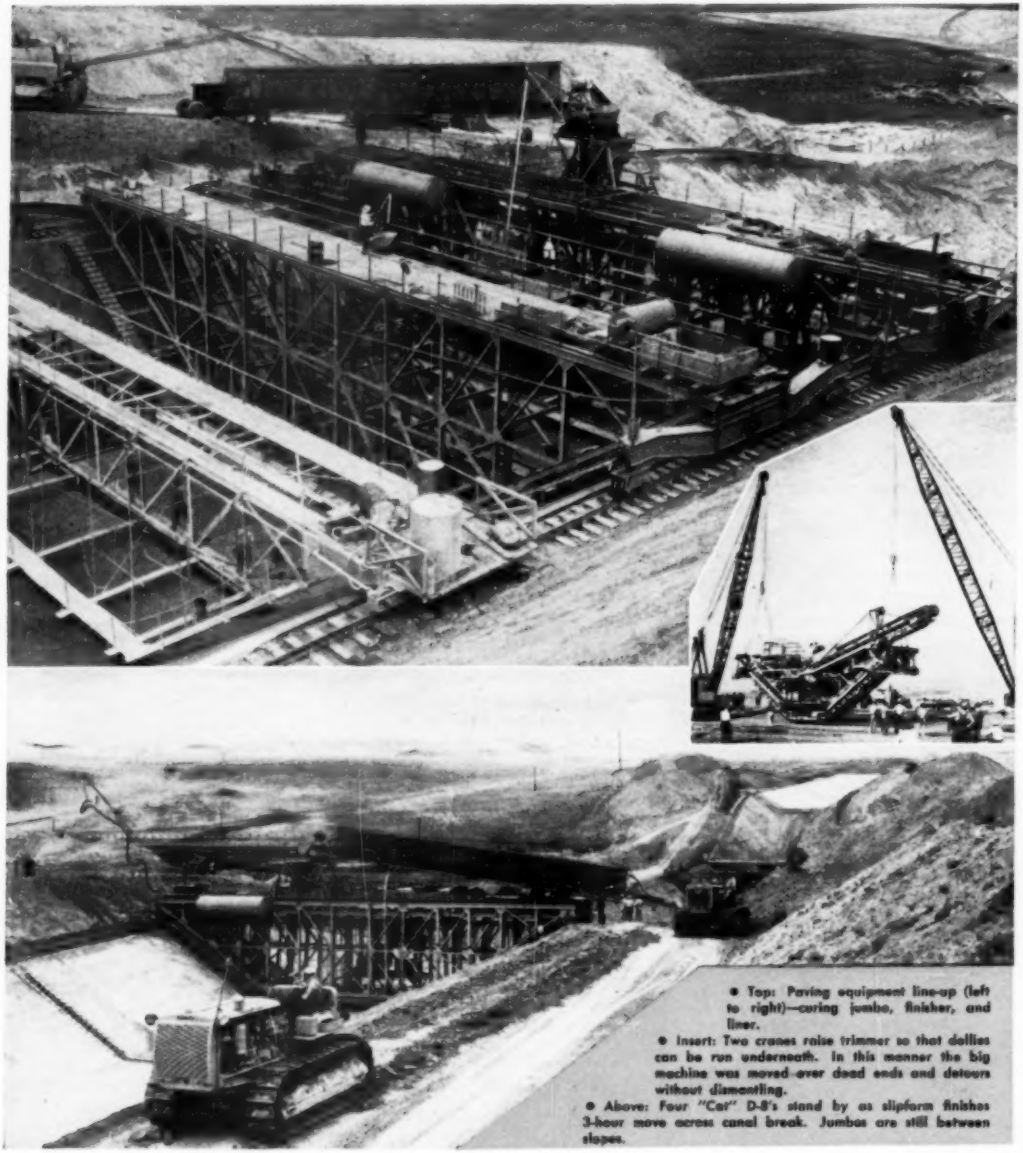

• Top: Paving equipment line-up (left to right)—curing jumbo, finisher, and liner.

• Insert: Two cranes raise trimmer so that dollies can be run underneath. In this manner the big machine was moved over dead ends and detours without dismantling.

• Above: Four "Cat" D-8's stand by as slipform finishes 3-hour move across canal break. Jumbos are still between slopes.

Portable Power Moves Walker

Faced with the problem of moving its 115-ton Bucyrus-Erie 3-W electric dragline five miles overland, Park Coal Co., Walsenburg, Colo., powered the machine with a 17-ton, 300-hp diesel power plant on a 23-ft trailer.

• Followed by its portable power unit, the 3½-yd. dragline takes one step after another down a stretch of highway running along part of 5-mile trip to Victor-Ravenwood mine.

LAST JANUARY, Park Coal Co., Walsenburg, Colo., strip-mined the last of the coal in the CF & I Pictou mine, two miles northwest of Walsenburg. The firm wanted to move its 3½-yd. electric walking dragline—with as little lost time as possible—to the Victor-Ravenwood mine, three miles southwest of Walsenburg. So the job was done in an unusual way for a machine of this size—with power generated by a portable plant. Usually such large rigs are moved overland by power supplied from power lines by temporary connections.

The plant consisted of two units—each a Caterpillar D-13000 145-hp, 90-kw diesel-electric set (self-regulated) with a Louis Allis generator. Wired in parallel, the generators supplied 3-phase, 60-cycle alternating current at 440 volts to three transformers stepping up to the 2,300 volts required by the dragline. Diesel-electric generators and transformers were mounted on a 23-ft. Fruehauf 4-wheel trailer towed by an Army surplus half track.

Moving operations began at Pictou at 3 PM on January 18, and the big dragline was already at work stripping coal at Ravenwood at 3 PM, January 21, having covered the five miles in three days. Five railroad tracks, several irrigation ditches, a paved highway, a river, and a deep gulch were

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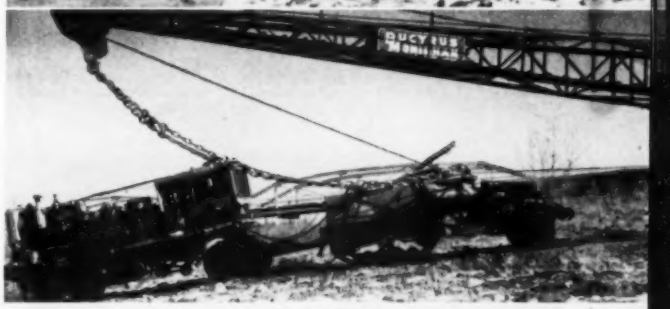


• Above: The 115 ton walking dragline takes one of its 6-ft. steps into a stream, one of various obstacles crossed on 3-day walk.

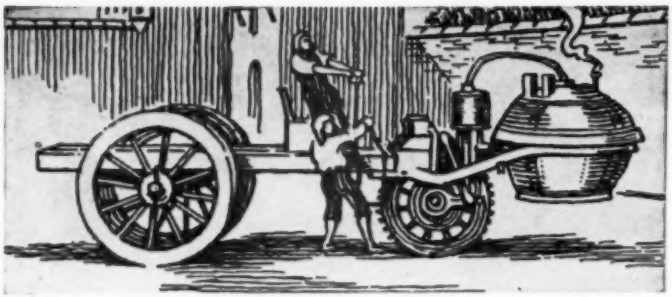
• Center: Close-up of power plant shows its two units—a Caterpillar D-13000 145-hp, 90-kw diesel-electric set with a Louis Allis generator—mounted on Fruehauf trailer towed by Army surplus half track.

• Bottom: Dragline went to work right after it reached the Victor-Ravenwood mine, still powered by the portable unit until a regular plant could be set up.

The Trac

Starting with Cugnot's artillery tractor of 1769, this article traces briefly the early development of wheeled and crawler industrial tractors.

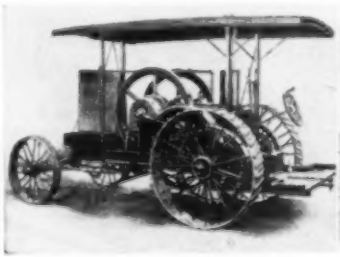
By H. T. Reishus
General Manager, Industrial Power Division, International Harvester Company



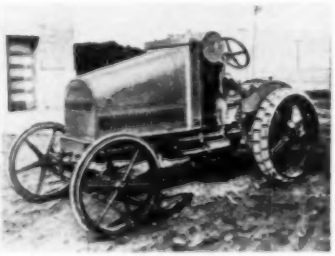
• Sketch of Cugnot's artillery tractor, built in France in 1769. The first tractor on record, the single front wheel was used for propulsion and steering.

• This Best industrial steam tractor built in 1894 was successful only on fairly straight, smooth roads.

• Gasoline power came in during the 1890's. This model has 1-cylinder engine mounted with friction drive to rear wheels.



• International put its first gasoline traction engine on this 1906 model. Rated at 20 bhp, it moved at about two mph.



• Here is one of the early applications of rubber to wheel tractors for industrial service.

• A pioneer mechanized road construction scene of about 40 years ago. The highway commissioner who owned this outfit said that the gasoline engine did twice the work of a 16 hp steam traction engine, was simpler and easier to handle.

THE FIRST crude ancestors of today's earthmoving tractors began to appear shortly after the invention of the steam engine by James Watt in 1765. The first tractor we know about was Cugnot's artillery tractor, built in France in 1769. A single front wheel was used both for propulsion and steering. Unfortunately, the poorly-balanced machine toppled over with disastrous results during the first public demonstration while attempting a turn. The enthusiastic inventor—who had been on board with several other men—was jailed, presumably for developing a public menace.

Steam traction engine development went forward slowly over the next 100 years. By 1890, U. S. production was only 2,500 to 3,000 steam tractors per year. Although a vast improvement over animal power, these cumbersome rigs with their large turning radii, top-heavy construction and poor tractive ability were successful mainly for stationary belt work, road rollers, plowing large level fields and logging on fairly straight and smooth roads.

A wide-wheel steam tractor was built in 1898 by the Holt Mfg. Co., of Stockton, Calif. in an endeavor to get traction and flotation on soft land. Drawbacks of this machine led to the commercial development of the crawler tractor, which we will discuss later.

Internal combustion engine development did not start until more than 100 years after Cugnot's invention when N. A. Otto brought out a 4-cycle gas engine in 1876, which in turn preceded Rudolf Diesel's success by 22 years. The idea of the modern tractor was really born about 1890 when steam tractor users mounted Otto cycle engines on steam tractor chassis. Most of these tractors had only one speed

tor—How It Grew

• The author.

forward and reverse or a friction drive to the rear wheels.

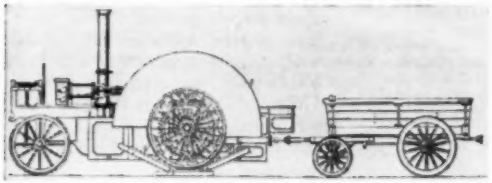
By 1906, when International Harvester entered the tractor field, Hart-Parr, Huber, Best, Kinnard-Hines, Lauson, and a number of others were already making a few gasoline tractors. These were clumsy affairs, all intended mainly for agricultural drawbar work. A few found their way into road maintenance, pulling drags, wagons and graders.

As the number of tractors and automobiles increased, gasoline became much higher in price per gallon than kerosene. This resulted in tractor engines being modified to burn kerosene after warming up on gasoline. Kerosene persisted as the dominant tractor fuel until the 1930's when the trend to home heating by oil and development of the automotive diesel brought distillate and fuel oil into the picture in place of kerosene.

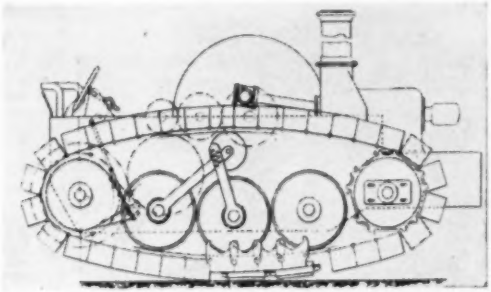
Diesels Gaining Favor

Conventional or Otto cycle engines lose power, idle poorly and dilute the lubricating oil when used with fuel less volatile than gasoline. Diesel engines, on the other hand, not only give outstanding performance on fuel oil, but also burn much less fuel than conventional engines in doing the same amount of work. As a result, diesel engines have already taken over the large tractor field, and are encroaching on the smaller tractor class now powered mainly by high compression straight gasoline engines.

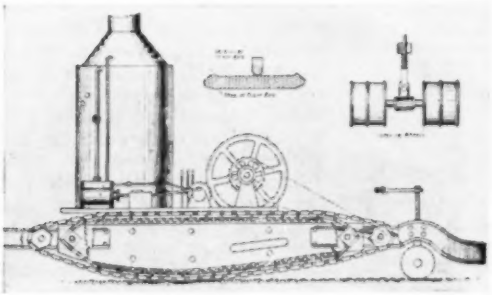
Progress in rubber tire development, along with better engines, transmis-



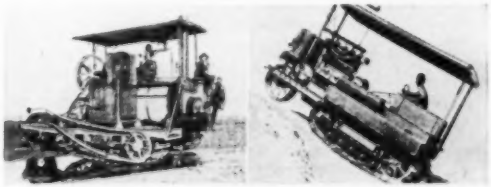
• Development of track-type tractors goes back to the 1850's. Boydell's steam traction engine was built about 1856.



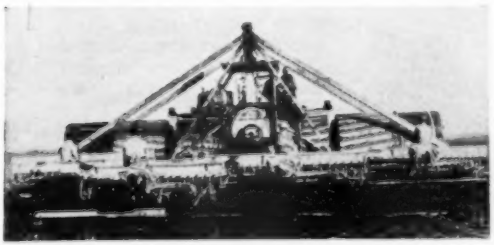
• Original Roberts chain tractor of 1904 was one of first full track machines. British observers called it a "Caterpillar."



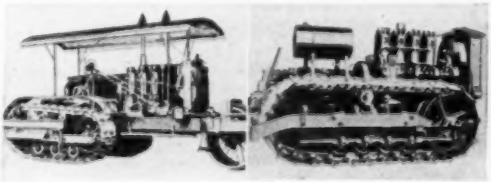
• F. W. Batter obtained a patent in 1888 on this proposed American chain track steam-powered tractor.



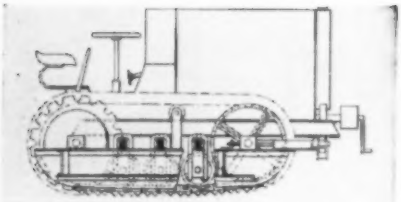
• Holt solved flotation problem by putting tracks on steam engine in 1904 (left). He built this gasoline tractor in 1908 (right) for commercial sale.



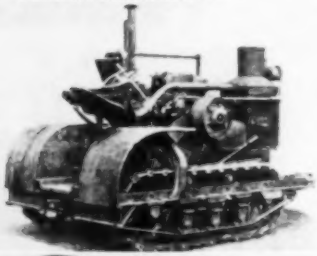
• Drawbacks of Holt's wide-wheel steam tractor, built in 1898 to get traction and flotation on soft land, led to development of crawler tractor.



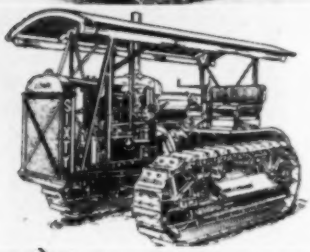
• Best entered track-type tractor field about 1913. While front tiller stayed on bigger sizes until 1919 (the 1913-19 "75" model is left), smaller "40" (right) which came out in 1915 was of full track type. Model numbers indicate roughly the drawbar hp ratings.



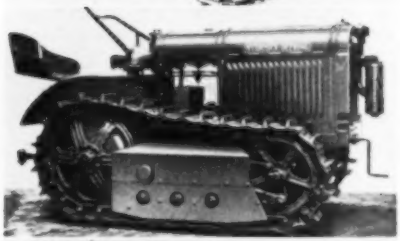
• Drawing shows Cletrac crawler introduced in 1918. It had controlled differential steering which slowed one track and speeded up the other.



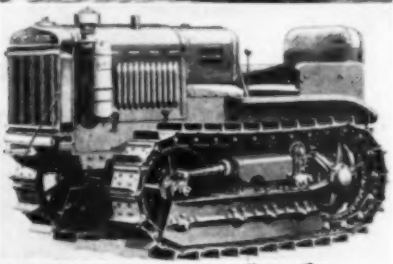
• Here is a 1920 number of the Rumely "oilpull" on tracks which was among the Advance-Rumely models being made when Allis-Chalmers acquired the line in 1931.



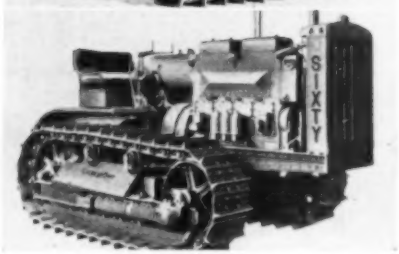
• In 1924 Best tested this "60" at Lincoln, Neb. It weighed 20,000 pounds. When Holt and Best merged in 1925 to form the Caterpillar Tractor Co., it was one of the models which continued in production.



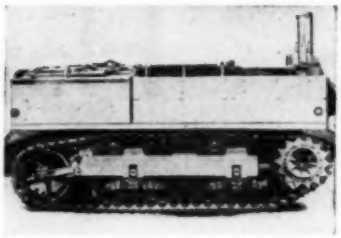
• International entered the track-type tractor business in 1928, applying tracks to an industrial wheel tractor (of Model 20 size shown on opposite page) mainly for agricultural drawbar work.



• This T-20, released in 1931, was International's first tractor designed throughout as a crawler. It had 24 drawbar hp, was noted for its fully enclosed but accessible unit construction.



• Caterpillar introduced the first crawler tractor with diesel power in 1931. It was this 24,000-lb., 70 drawbar hp "60."



• During the war three crawler manufacturers built high-speed prime movers like this M-5. Their extensive use showed that, with suitable power and tracks, speed ranges could be increased far beyond the five to eight mph of current makes.

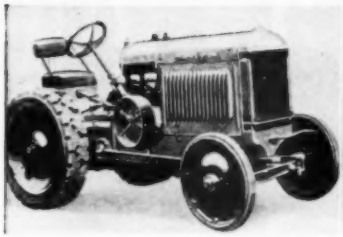
sions and steering, has made possible the big rubber-tired earthmovers of today. A significant milestone was the introduction—in 1936—of the low-pressure type pneumatic tire for use on tractors. The greatest industrial wheel tractor progress in the last 10 years occurred in the earthmover class which alone is approaching a $30 million annual manufacturers' volume. The trend today is toward more power per pound of tractor weight, and to high-speed automotive diesel engines. Advantage is being taken of allied equipment for traction weight and better maneuverability.

Evolution of the Crawler Tractor

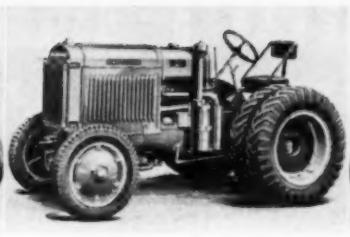
The crawler tractor, miracle construction weapon of World War II and backbone of the construction industry, is today nearly a $200 million annual manufacturers' business. This is roughly 30% of the excavating and earthmoving total as reported in the Department of Commerce, Bureau of the Census "Facts for Industry." The track-type tractor was developed to satisfy needs for greater drawbar pull, more traction, and flotation than available in round-wheel tractors.

Practical conceptions of the tracklayer idea date back to the 1850's when paddles were first applied to steam traction engine wheels. The mechanical action gave somewhat the same result as now obtained much more efficiently with low-pressure pneumatic tires.

Chain tracks began to appear in tractor patent drawings in the 1880's. The Roberts chain tractor of 1904, however, was one of the first full track machines built. This unit was steered through an ordinary differential with independent brakes for each track. When it was demonstrated to members



• This International 20 wheel tractor of 30 bhp was introduced with solid tires in 1924.



• International 1-30 of 1932 with speeds to 10 mph had high pressure pneumatic tires.

• First industrial diesel-powered wheel tractor was ID-40, introduced in 1936 had low pressure pneumatic tires.

of the British War office in 1905, observers called the machine a "Caterpillar," a name already applied in 1904 to the first practical tractor with chain tracks made in U. S.

The Holt Manufacturing Co. had a flotation and traction problem on big steam tractors used in soft California soil. Benjamin Holt found the solution to this problem in 1904 by putting tracks in place of the rear drive wheels on a steam engine. By 1908 Holt was in production on "Caterpillar" tractors powered by gasoline engines, and early registered this descriptive name as a trademark for his product.

C. L. Best entered the track-type tractor field about 1913, and both Best and Holt prospered in production of machines which were found to put a much higher percentage of engine power onto the drawbar under various ground conditions than the then-common steel-wheeled tractors. This still holds true today with respect to crawler versus rubber-tired tractors when heavy pulls are required with minimum weight on soft, wet, or rough ground.

Cletrac introduced a tractor with controlled differential steering in 1916. The Caterpillar Tractor Co. was formed by a merger of the Holt and Best lines in 1925 and the first "30" and "60" models were carried over from the Best machines. Allis-Chalmers acquired the Monarch line in 1928 and the Advance-Rumely in 1931.

The great activity in crawler tractor development during the 1920's and increasing sales of these tractors brought International Harvester into the track-type industry in 1928.

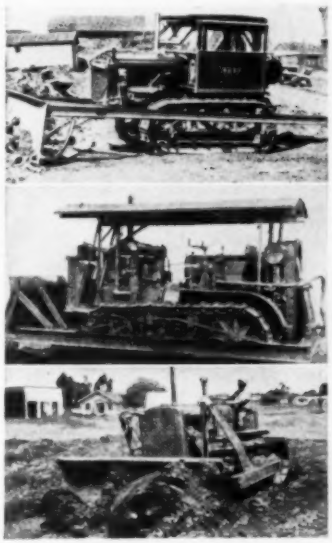
The first crawler with diesel power was the 24,000-lb., 70 drawbar hp Caterpillar "60." In 1933, International helped move the diesel into the range of the smaller power user with the 12,000-lb., 44 drawbar hp TD-40.

Military men say, "When in doubt, use tracks." During the war, three of the crawler manufacturers built high-speed prime movers. These military tractors proved that, with suitable power and tracks, the travelling speed range could be greatly increased beyond the five to eight mph top speed in present commercial crawlers. Therefore, as development proceeds, higher speeds may become standard in track-type tractors.

Today's tractors are of no use without allied equipment—the working tools attached to them. Tractors are designed to take loads imposed by equipment and power drives are generally available either front or rear as best suited for power control units.

Numerous inventors and manufacturers have participated in the development of allied equipment. LaPlant-Choate, for example, appears to have been the first manufacturer to mount a bulldozer blade on a crawler tractor —in 1922. This blade was simply a plain flat steel sheet pushed from a light frame mounted around the trac-

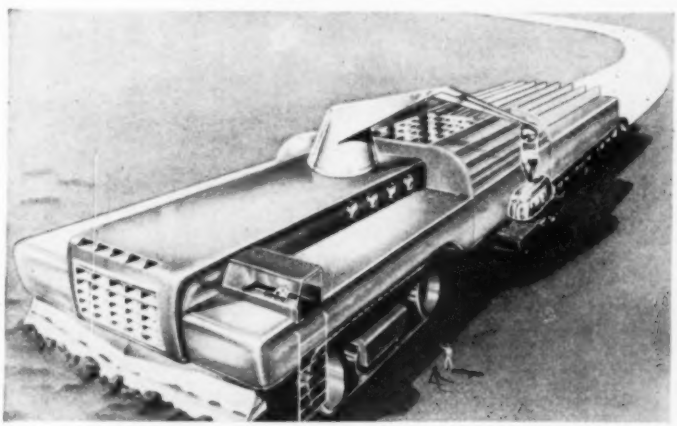
Continued on page 61



• Top: LaPlant-Choate was first to mount a blade on a crawler tractor—1922.

• Center: First hydraulic controlled dozer made by LaPlant-Choate in 1930.

• Bottom: A cable-controlled dozer of the '30's.



• Strictly out of Flash Gordon, this futuristic 1-unit road-builder was dreamed up for an advertisement of the Bohn Aluminum and Brass Corp., Detroit.

$20 Million Recreation

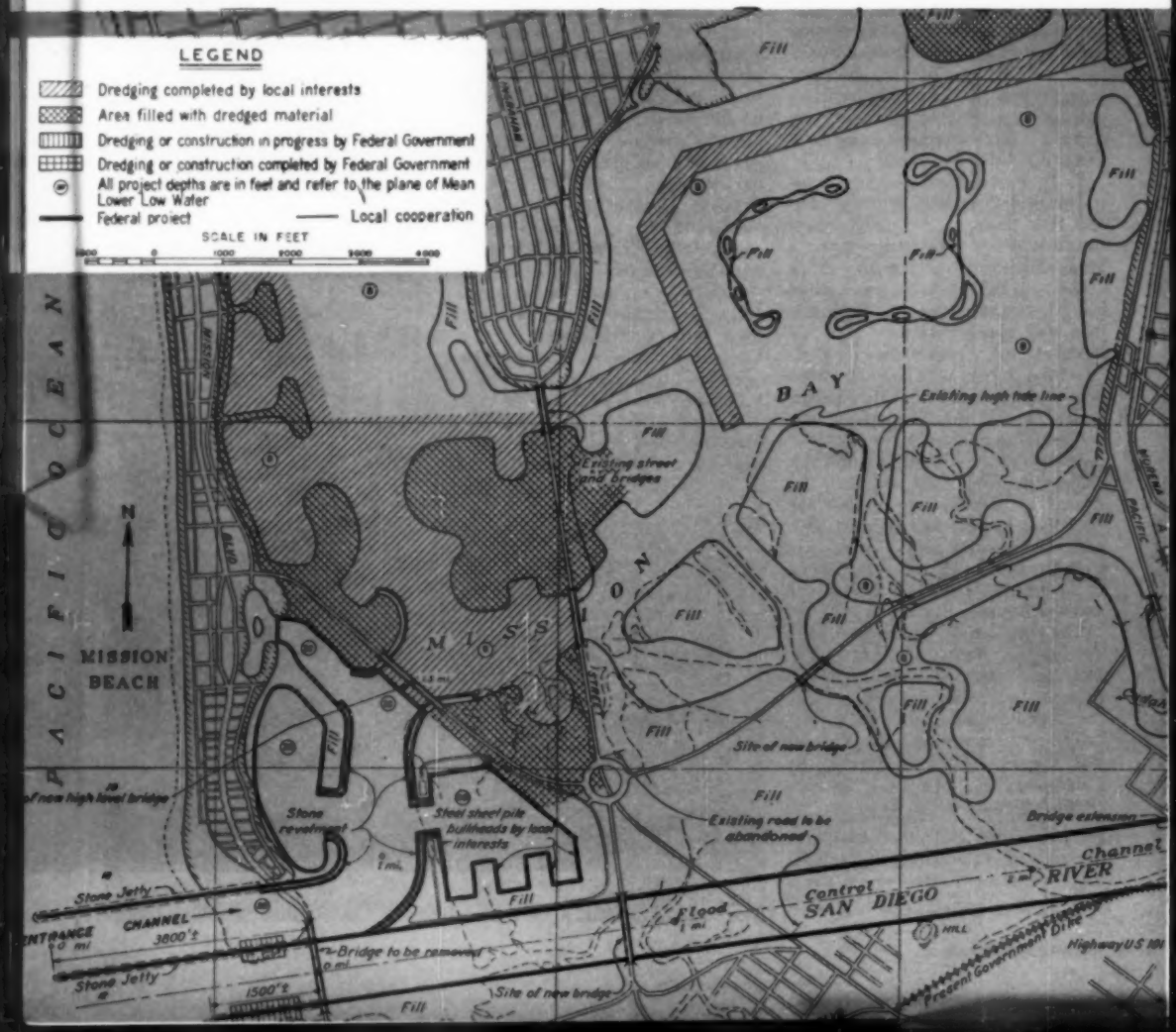
In ten years, Mission Bay, now nothing but 4,000 acres of mud flats and shallow water at low tide, will be a park and yachting center. Over 200 acres of new land have already been built by 3,600,000 cu. yd. of silt dredged from the bay channel, and 360,000 tons of rock are going into a jetty now under construction — 10,000 tons of stones weighing 12 tons plus.

By Vollie Tripp and James E. Hampton

TIME AND TIDE wait for no man, as the old saying goes—and it's better in the long run to work with the tides than to try to beat them. Contractors busy on the projected $20 million Mission Bay program at San Diego, Calif., keep close watch on the tides to make their work easier. Right now, J. B. Stringfellow, Riverside, Calif., the contractor who is working on one of three jetties in the project, keeps his men "above water" by putting down foundations at low tide, armor rock as the ocean comes in.

Just a small part of a huge project which will culminate in a model boating and yachting basin and recreation center, three jetties are being placed at the bay entrance. One will be built on either side of the channel entrance into the bay. The third, on the south side of the river, was completed in

• This map of the Mission Bay and San Diego River improvement project shows the condition of work as it had progressed by the middle of last year. When the program envisioned by the plan is completed in the anticipated ten years, the mud flats and shallow waters of Mission Bay—marked for "fill" here—will be "islands" for camps, wild life projects, beaches and yachting centers.



Spot for San Diego

November of last year. It is 1,600 feet long and contains 60,000 tons of rock.

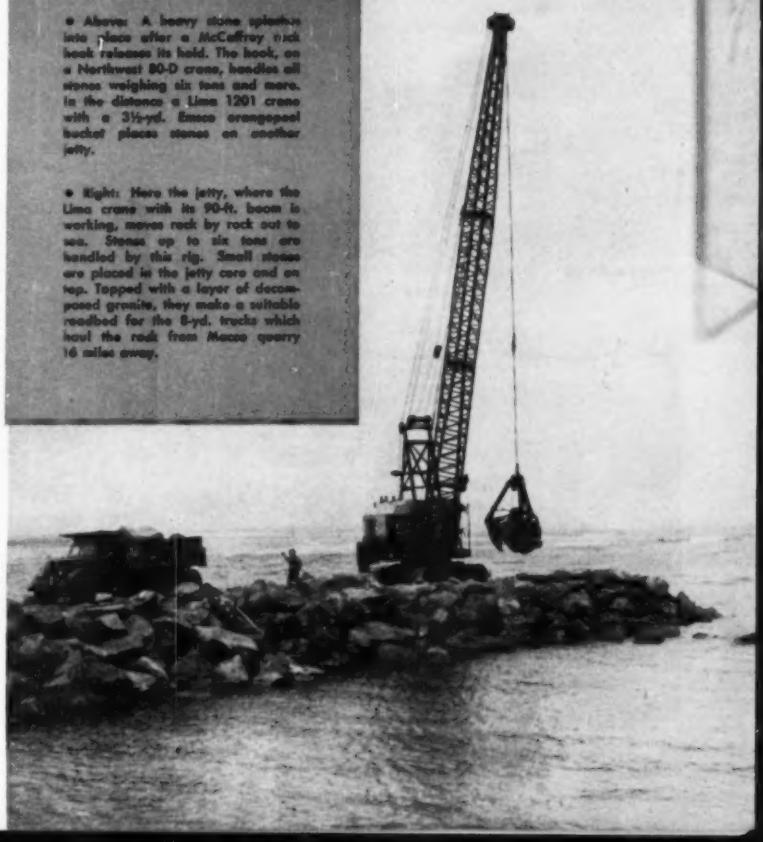
The purpose of the jetties is to define the tide channel into the bay, prevent erosion of an exposed section of beach by the sea, and to confine the flood control channel of the river. They are being constructed parallel to one another, about 900 feet apart, center line to center line. Although Macco Corp., Clearwater, Calif., holds the $1,117,900 contract for two of the jetties, Stringfellow has the subcontract for the hauling and placing of the rock.

Mission Bay, or False Bay as it was formerly called, is an area of 4,000 acres of extremely shallow water lying just north of San Diego Bay. Several hundred acres of worthless mud flats are exposed at low tide when water is not deep enough to accommodate boats and too muddy to be used for any purpose.

Long before the war, civic leaders envisioned a park and recreation center in the area. When all the red tape of beginning such a project finally cleared away, the State of California had ceded the bay to the City of San Diego and promised to spend $2 million for flood

• Above: A heavy stone splashes into place after a McCaffrey rock hook releases its hold. The hook, on a Northwest 80-D crane, handles all stones weighing six tons and more. In the distance a Lima 1201 crane with a 3½-yd. Esmco orangepeel bucket places stones on another jetty.

• Right: Here the jetty, where the Lima crane with its 90-ft. boom is working, moves rock by rock out to sea. Stones up to six tons are handled by this rig. Small stones are placed in the jetty core and on top. Topped with a layer of decomposed granite, they make a suitable roadbed for the 8-yd. trucks which haul the rock from Macco quarry 16 miles away.



control; the Federal government, with jurisdiction over San Diego River had authorized the work of the multi-purpose project and agreed to spend $6 million; and, the citizens of San Diego had voted a bond issue of $2 million as a beginning.

Dredging Operations

The first part of authorized funds was spent to pump bay sand from the channel entrance to deepen it. The sand was used to build artificial coves and spits of land. Franks Dredging Co. of San Francisco, Calif., and the Newport Dredging Co. of Newport Beach, Calif., held the two million cu. yd. contracts, beginning work two years ago.

Getting the dredges into the bay was a preliminary problem. Under the direction of Johnson-Western Waterfront Construction Co., Coronado, Calif., it was solved by removing a section of bridge crossing the bay channel. Barges were floated under the removable span and partially filled with water. As the barges were lowered, shoring was placed under the span and then the water pumped from the barges. The rising tide helped to lift the span and the bridge section was floated clear.

The dredges—the "Dallas" belonging to Franks and "Little Aggie" owned by Newport—are 16-in. suction dredges electrically operated, using disposal pipelines 3,000 to 5,000 feet long. To date 3,600,000 cu. yd. of silt have been pumped out of the bay to build up 237 acres of new land. The dredges were able to pump 6,000 to 8,000 cu. yd. every 24 hours. Dredging operations ceased in the fall of 1948, but the two giants are still anchored in the bay waiting to begin another phase of operations which will get underway in the near future.

Flood Control Channel

When the flood control channel is completed and there is no longer danger that the river will silt up portions of the bay, dredging operations can be resumed. The river is dry most of the time or impounded behind dams, but it still drains approximately 440 square miles of land. During floods it carries an immense amount of silt and debris, which, in its present course, it empties into the bay. As a result, it was deemed unwise to dredge any part of the bay close to the river's mouth until the channel is made and it can conduct directly to the sea.

After completion of the second jetty which will make the new flood control channel possible, the inner bay will be dredged to a depth of eight feet. The outer bay will then be deepened to 20 feet at high tide. Silt dredged from the bay will be used to build up low parts of the bay for park development.

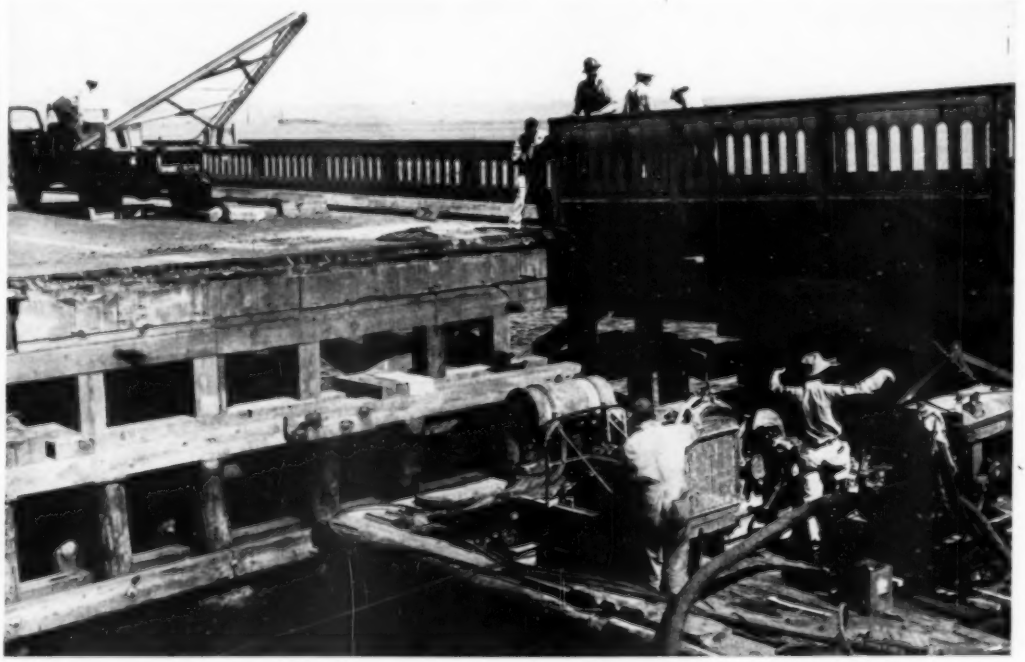
At present, work is going on at the second jetty. It will jut 3,800 feet into the sea and will require 300,000 tons of rock. Width is 16 feet at the top.

Specifications call for stone weighing not less than 165 pounds per cubic foot. Four classifications of rock, by weight, are named in the government contract. Of the 360,000 tons required for the two jetties, 190,000 tons of rock must weigh one ton to six tons or more each, while 10,000 tons must exceed 12 tons each. The seaward end of the jetty is armored and anchored with the heavier stones; smaller stones are used in the center core.

A hard, igneous rock of the granite

Continued on page 58

• Johnson-Western Waterfront Construction Co., Coronado, Calif., was given the job of removing a section of a bridge in order to get the dredges into the bay. Here a barge is floated under the span. The barge was partly filled with water, and shoring placed under the bridge span. Water ballast was then pumped out and a rising tide helped float the barge-supported bridge section clear.



BAILEY CONSTRUCTION CORPORATION

—scientific coal strip-mine operator—

prefers J&L *Precisionbilt* Wire Rope

J&L STEEL

A Bucyrus-Monighan 5W dragline excavator, equipped with J&L wire rope, operating a 6-yard bucket, removing over-burden at the Thomas, W. Va. coal strip-mining operation of Bailey Construction Corporation.

The reasons? Better performance and longer life assured by J&L wire rope engineering service.

Bailey Construction Corporation, organized by Mr. Harold L. Bailey, noted coal mining engineer of Schuylkill Haven, Pa., has two coal strip-mining operations under way in West Virginia. One near Thomas, in Tucker County, has four working pits now in operation. The other, soon to be in full production, is at Lorado in Logan County.

On every piece of Bailey's modern equipment . . . draglines, shovels, bull-dozers . . . you'll find J&L *Precisionbilt* Wire Rope in a variety of sizes and types, each designed to do a particular job.

One of the basic principles of all Bailey operations is this: *Use only the very best of equipment—and use it properly.*

That's why Bailey has standardized on J&L *Precisionbilt* Wire Rope. Says Mr. Bailey: "Our experience has proved that the combination of J&L Wire Rope and J&L engineering service gives us better performance, longer rope life and lower over-all costs."

There's a growing list of top flight companies engaged in earth-moving, oil production, lumbering, general manufacturing and transportation, that use J&L Wire Rope *exclusively!* Like the Bailey Construction Corporation, they find that J&L *Wire Rope* and J&L *Engineering Service* work together to cut costs and increase profits.

If you are interested in getting the complete details on J&L *Wire Rope Engineering Service* and what it can do for you, why not clip the coupon?

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From its own raw materials, J&L manufactures a full line of carbon steel products, as well as certain products in OTISCOLOY *and* JALLOY *(hi-tensile steels).*

PRINCIPAL PRODUCTS: HOT ROLLED AND COLD FINISHED BARS AND SHAPES • STRUCTURAL SHAPES • HOT AND COLD ROLLED STRIP AND SHEETS • TUBULAR, WIRE AND TIN MILL PRODUCTS • "PRECISIONBILT" WIRE ROPE • COAL CHEMICALS

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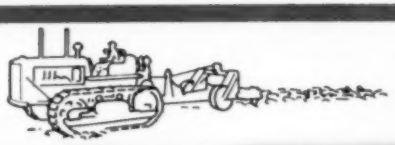
Standard on Power that Pays

CRAWLER TRACTORS • WHEEL TRACTORS • DIESEL ENGINES • POWER UNITS



GOOD MEDICINE

Just what the doctor ordered . . . *red-painted* International Diesel Crawlers keep balance sheets healthy by boosting production and guarding costs. They deliver their full-rated horsepower on every job, yet hold in reserve additional lugging ability for handling sudden overloads that would otherwise kill.

Their starting and combustion systems, fuel feed, speed governing, torque control, lubricating methods and overall rugged construction account for their superior performance and long-lived stamina.

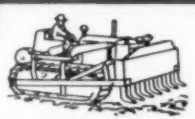
Since reliable, economical power is "good medicine" for any power-using business, it will pay you to contact your International Industrial Power Distributor. Get International Diesels on your jobs now.

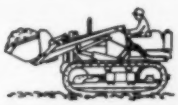
INTERNATIONAL HARVESTER COMPANY, Chicago

An International TD-18 Diesel Crawler fills its 8-yard scraper quickly on this tough, deep-sand road job. Latest model, with increased drawbar horsepower and many improvements, is now available.

INTERNATIONAL HARVESTER

INTERNATIONAL
INDUSTRIAL POWER





Equipment You Ought to Know About

Off-the-Road Tires

Manufacturer: B. F. Goodrich Co., Akron, Ohio.

Claims: Off-the-road tires made with nylon cord throughout, and including the nylon shock shield are being made for use by contractors, open pit, strip mine and quarry operators, and loggers.

Tire body strength is increased because the same number of plies is maintained in the tires, and nylon cord is twice as strong as the rayon previously used. Tires made with nylon cord will also withstand more than double the impact without rupturing.

Tires are of weftless construction in which there are no cross threads. This construction controls and equalizes tension of the cord. Users can also have a larger percentage of tires recapped.

In a 2-year testing program for nylon cord tires, not a single blowout occurred.

Tires in which the new construction is utilized are in the following sizes: 11.00-20 and 11.00-24, 14-ply; 12.00-24, 16-ply; 14.00-24, 16.00-24, 18.00-24 and 21.00-24, 20-ply; and 16.00-24, 18.00-24 and 21.00-24, 24-ply.

Drainage Hole Drill

Manufacturer: Hydrauger Corp., 681 Market St., San Francisco, Calif.

Claims: The Hydrauger machine is used to bore horizontal drainage holes, a method of stopping mass ground movements in cuts and fills on highways and railroads. The machine is operated by compressed air and can produce bores up to 200 feet in length. It will average 50 feet of 4½-in. hole

per hour. One man can attach the boring bar sections and run the machine.

The Hydrauger was originally developed for installing pipelines and drainage systems under highways and paved streets. It has been used for the horizontal drainage hole method during the past few years. In one state, thousands of feet of slightly sloping hole have been prepared by the machine for the insertion of perforated liners. Usually 4-in. bored and reamed holes placed at predetermined spacings are adequate.

Tractor Hoe Front

Manufacturer: Hyster Co., Portland, Ore.

Claims: A ½-yd. hoe front is an attachment for the D-7 and D-8 Hystaway for use with Caterpillar track-type tractors. The hoe dipper has a cutting width of 33 inches. For narrow ditching an optional 23-in. dipper may be substituted.

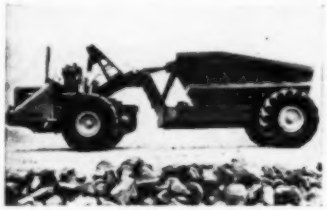
Full tractor mobility, maneuverability and conversion characteristics of the Hystaway are retained with the new hoe front. Utility use of the bulldozer is possible with the Hystaway installed. It takes one hour to dismount the Hystaway to allow full production bulldozer use. The entire unit may be mounted on the tractor in about two hours, following the initial installation.

Wagon Unit

Manufacturer: Wooldridge Mfg. Co., Sunnyvale, Calif.

Claims: The Terra Cobra wagon TC-W14 is available complete with 200-hp Terra Cobra TC tractor, or as wagon unit W14 only, designed for interchange with Terra Cobra self-propelled scraper units.

With a 20-yd. heaped capacity and 14 struck, the tapered bottomless hopper spot dumps to rear or spreads to desired lift by moving back on roller tracks. Positive fore and aft motion of body is effected by air-controlled cables reeved without reverse bends in such a manner as never to contact load. Cable is accessible at all times.



Hopper, which will pass rock up to 48-in. diameter, and stationary chassis bottom plate are of heavy abrasion resistant alloy steel.

Rear wheel brakes operate from two air reservoirs on wagon, and set automatically if air supply from tractor is interrupted. They may be set by hand from operator's cab. A disk parking brake is included on the tractor unit.

Aggregate Bins

Manufacturer: New Holland Mfg. Co., Mountville, Pa.

Claims: New aggregate bins are standard 1-compartment 21-cu. yd. straight and jack leg bins and 3-compartment 21-cu. yd. bins. The 1-compartment bin is 10 feet square while the 3-compartment bin measures 8x12 ft. Overall height is 16 feet. Truck clearance under the bin is eight feet.

Brake Blocks

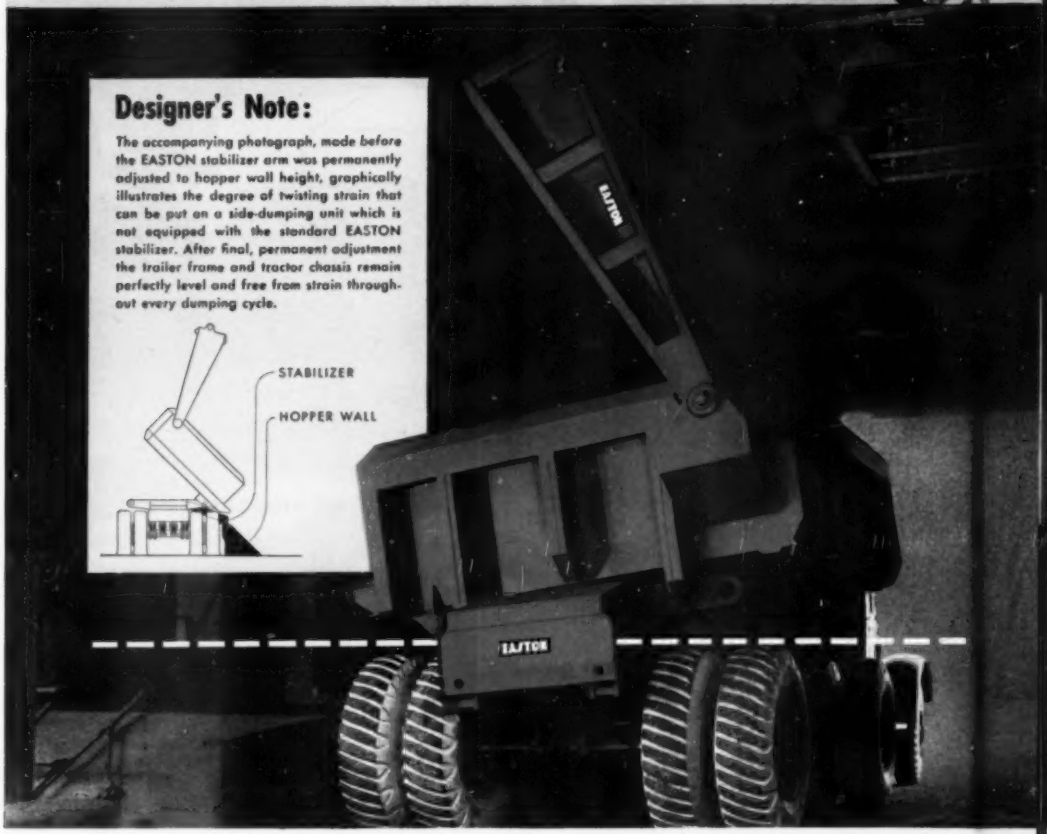
Manufacturer: Gatke Corp., 228 N. La Salle St., Chicago 1, Ill.

Claims: MW brake blocks, originally developed to meet the requirements of flame hardened drums, are a combination of the two main types of asbestos friction materials integrally moulded into unified brake blocks. This development combines the qualities of woven asbestos and moulded asbestos

Continued on page 38

The Sensational New MODEL TL

Illustrating the large capacity lift-door trailer recently introduced by EASTON and now entering service in cement plant and iron mining operations. Available in capacities to thirty tons, or larger. Dumped by automatic overhead hoist.



Designer's Note:

The accompanying photograph, made before the EASTON stabilizer arm was permanently adjusted to hopper wall height, graphically illustrates the degree of twisting strain that can be put on a side-dumping unit which is not equipped with the standard EASTON stabilizer. After final, permanent adjustment the trailer frame and tractor chassis remain perfectly level and free from strain throughout every dumping cycle.

Dollars and Sense...

Shovel to crusher quarry haulage is a highly specialized operation. It affords a clean-cut opportunity for time and cost study, and for the application of highly efficient, special purpose methods and equipment. That's why haulage costs can be so extremely low with EASTON Special Purpose Trailers. For a free time and cost study of EASTON Trailer Haulage on your property, write to: Easton Car & Construction Company of Easton, Pa.

B-1033

PATENTED
DOORLESS PAN

Model TRB · 14 to 20 tons

PATENTED
LIFT DOOR

Model TL · 20 to 30 tons ·

PATENTED
DROP DOOR

Model TD · 20 to 30 tons

SPECIAL PURPOSE

EASTON
Trailers

Makers of Easton Mine and Quarry Cars and Easton Heavy-Duty Truck Bodies

On Garrison Dam

lots

Contractors and engineers are using the most modern earth moving equipment—and lots of it—to build the world's greatest rolled earth fill dam on the Missouri River in North Dakota. Garrison Dam—scheduled for completion in 1953—will be 210 feet high and will have a crest length of 12,000 feet. A total of 75,000,000 cu. yds. of earth and rock fill will be required for the embankment.

Euclid equipment gets the call again at Garrison Dam! Sixty-six Bottom-Dump and 3 Rear-Dump Euclids, 5 Euclid Loaders and 3 water wagons will soon be on the job . . . hauling more and bigger loads at less cost . . . providing dependable, long-life service at low maintenance cost under a wide range of operating conditions.

A big, tough job—Garrison Dam! It's part of a tremendous project of the Corps of Engineers to eliminate destructive floods and harness rivers of the Missouri Basin for irrigation and hydro-electric power. A tough job, yes, but typical of hundreds of construction, mining, and industrial projects where "Eucs" have proved their ability to stay on the job, efficiently and dependably, day after day.

EUCLID

EUCLIDS

EUCLID all the way!

PETER KIEWIT SONS' CO. & MORRISON-KNUDSEN CO.
DEPEND ON EUCLIDS!

For their 20,000,000 yd. contract these contractors standardized on Euclid equipment because they know from experience that "Eucs" move more yards more profitably. For hauling the bulk of the earth and gravel, 66 Bottom-Dump Euclids of 25 cu. yd. capacity will be used. These units are powered by Butane engines of 300 h.p. and have a loaded top speed of 28 m.p.h. Drive and trailer tires are 27.00 x 33. Using the same model Euclid tractor as the Bottom-Dumps, 3 water wagons of 10,000 gallon capacity will be used on the fill and haul roads.

The big fleet of Bottom-Dumps will be kept busy by 5 Euclid Loaders working in the huge borrow pits. One of Euclid's more recent developments, the Loader has established many new production records on dozens of airport, dam, and highway jobs . . . the wide cutting blade and 54" belt really load dirt fast! Rear-Dump "Eucs" of 22-ton capacity will haul heavy excavation—these are powered by 300 h.p. engines and have a top speed of 27.7 m.p.h. with full payload. Yes, it's Euclid all the way at Garrison!

The EUCLID ROAD MACHINERY Co., Cleveland 17, Ohio

CABLE ADDRESS: YUKLID — CODE: BENTLEY

Move the Earth

Continued from page 34

materials in proper balance for the specific application. Variation in the compositions and the proportions of the two materials provides adjustment of characteristics to the service.

The quick, positive engagement of the woven can be tempered with the smooth, non-grabbing action of the moulded. The proper degree of drum conditioning can be provided to assure frictional stability and avoid glazing on any kind of drum.

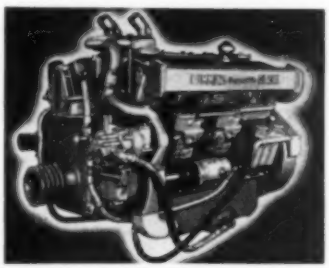
MW brake blocks are non-compressible and the moulded backing provides secure anchorage—bolt heads do not pull out.

The blocks are engineered for the application and precision moulded to size and drum curvature for easy installation and accurate fit without wear in.

Highspeed Diesel

Manufacturer: Cummins Engine Co., Inc., Columbus, Ind.

Claims: The new Cummins highspeed diesel NVHS-1200 is a 4-cycle,



12-cylinder, V-type, supercharged engine with a maximum rating of 550 hp turning at 2,100 rpm.

With its companion model NVH-1200, a naturally aspirated 4-cycle, 12-cylinder, V-type diesel having a maximum rating of 400 hp turning at 2,100 rpm, these engines provide operators of off-highway and industrial equipment the advantages of highspeed diesels in a higher hp range. They are designed for use in off-highway automotive units, other mobile mining and construction equipment, shovels, cranes and draglines, industrial locomotives and railcars, logging equipment, generator sets, and other portable and stationary applications.

Along with increased horsepower, high operating engine speed, and portability, the NVHS-1200 and NVH-1200 offer reduced overall engine dimensions in this hp range of single unit diesels.

These engines also are equipped with a new fuel pump. The single plunger of the new pump measures the fuel charge for all cylinders, assuring that each injector receives the proper predetermined amount of fuel at any required engine speed and load within the approved ratings. The fuel is delivered to the injectors at low pressure through a rotating distributor disc arrangement.

The new pump contains a double disc arrangement from which it gets its name—the "DD" pump. One disc allows fuel to pass into the metering pump, while the other performs the distributing function only.

Power Scraper Machine

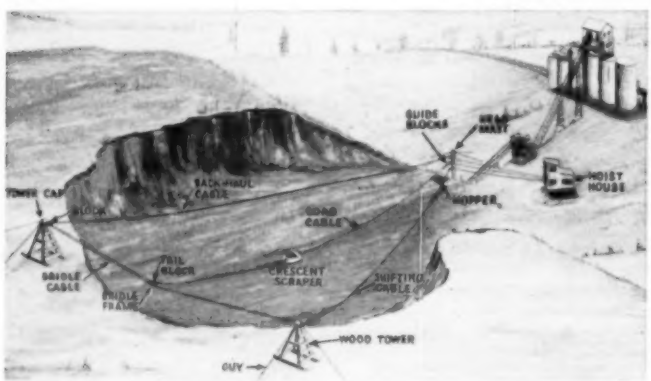
Manufacturer: Sauerman Bros., Inc., 574 S. Clinton St., Chicago, Ill.

Claims: A new series of power drag scraper machines in sizes from ⅓-yd. to 4-yd. is designed and equipped to afford automatic rapid tail-end shifting on cut-and-fill jobs, for strip mining and excavation of hard-packed material from banks or pits.

The units, known as rapid-shifting scraper machines, give the operator, stationed at the scraper hoist, automatic control of shifting the tail end of the machine. This permits the operator to spot the scraper bucket instantly wherever he wishes, without constantly shifting the line of bucket travel.

The heart of the rapid-shifting machine is a 3-drum hoist and elevated tail bridle assembly. A bridle cable is stretched between two tail towers, and on the cable rides a bridle frame for the tail block. The third drum of the hoist moves the bridle frame in one direction, the pull of the outhaul cable pulls it in the opposite direction, and the drum brake holds it positioned as desired.

Each machine is furnished with a gasoline, diesel or electric driven, 3-drum, roller bearing hoist. The normal specifications call for cable spans ranging from 200 feet for the small units, up to 400 feet for the largest units. These spans can be extended considerably if required. Timber tail towers are furnished by the purchaser, but the manufacturer will supply tower caps and drawings to help in their construction.



Tire Vulcanizer

Manufacturer: R. E. Schlegel, Inc., 114 E. Exchange St., Akron, Ohio.

Claims: The Air-Welder is a light, portable hot air blower (electrically operated) for vulcanizing a special rubber into a tire injury without physical pressure. Injuries not extending too deeply into the tire may be repaired without removing the tire from the vehicle. It weighs 17 pounds.

Additional advantage of making repairs in this manner is the fact that no change in equipment is required in going from a sidewall to a tread repair. No contour plates and other materials are necessary. Procedure for making spot repairs with the Air-Welder is the same as that used with a hot plate or vulcanizer through the cementing operation.

Air-Weld process consists of filling the tire's injury cavity with rubber to outer surface of tire. Then Air-Welder

Continued on page 42

NOW A NEW BANTAM

Illustrating the New BANTAM Trench Hoe with heavy duty 14' boom. New cast steel head permits larger, stronger axle and bushings to compensate for twisting strain.

NORMAL CAPACITY PER HOUR
Shovel or Dragline — 60 yards
Trench Hoe — 100 feet of five foot ditch
CRANE CAPACITY — 5 TONS

advanced engineering features for better performance, longer life, more profits for users

The new Model M-49 Schield BANTAM now combines many more big machine features with the basic design which has made it the outstanding machine of its type. Jack, drum, and swing shaft assemblies are now mounted on heavier Timken tapered roller bearings. Drums, swing gears, and vertical swing shaft roll on sealed-for-life pre-lubricated ball bearings.

A new *triple* roller chain drive is sealed in and runs in a constant bath of oil. All gears and pinions throughout the BANTAM are machine cut, and parts subject to extreme wear are flame hardened. The swing shaft is equipped with the same type internal expanding clutch that has proved so efficient on the drum shaft.

That's not all! Now three larger adjustable cam-type hook rollers carry load, reducing wear and maintenance costs. Turntable rollers are re-designed with larger axles and longer bushings cutting bearing pressure by 50%. Machine cut bull gear is jig drilled and bolted in place for rotation if necessary to distribute wear.

And here's an outstanding feature never before offered. The new BANTAM is furnished with an independent spur gear drive boom hoist of patented design. Boom may be powered up or down or lowered on brake for fast operation making the BANTAM adaptable to more jobs than ever before.

You'll like the new cab design which gives greater visibility and more convenience in servicing. Climb in and put your feet and hands on the new simplified controls. You'll agree the new BANTAM is the sweetest machine of its kind you've ever handled. Write for complete details.

THE SCHIELD BANTAM CO., INC.
202 PARK STREET • WAVERLY, IOWA

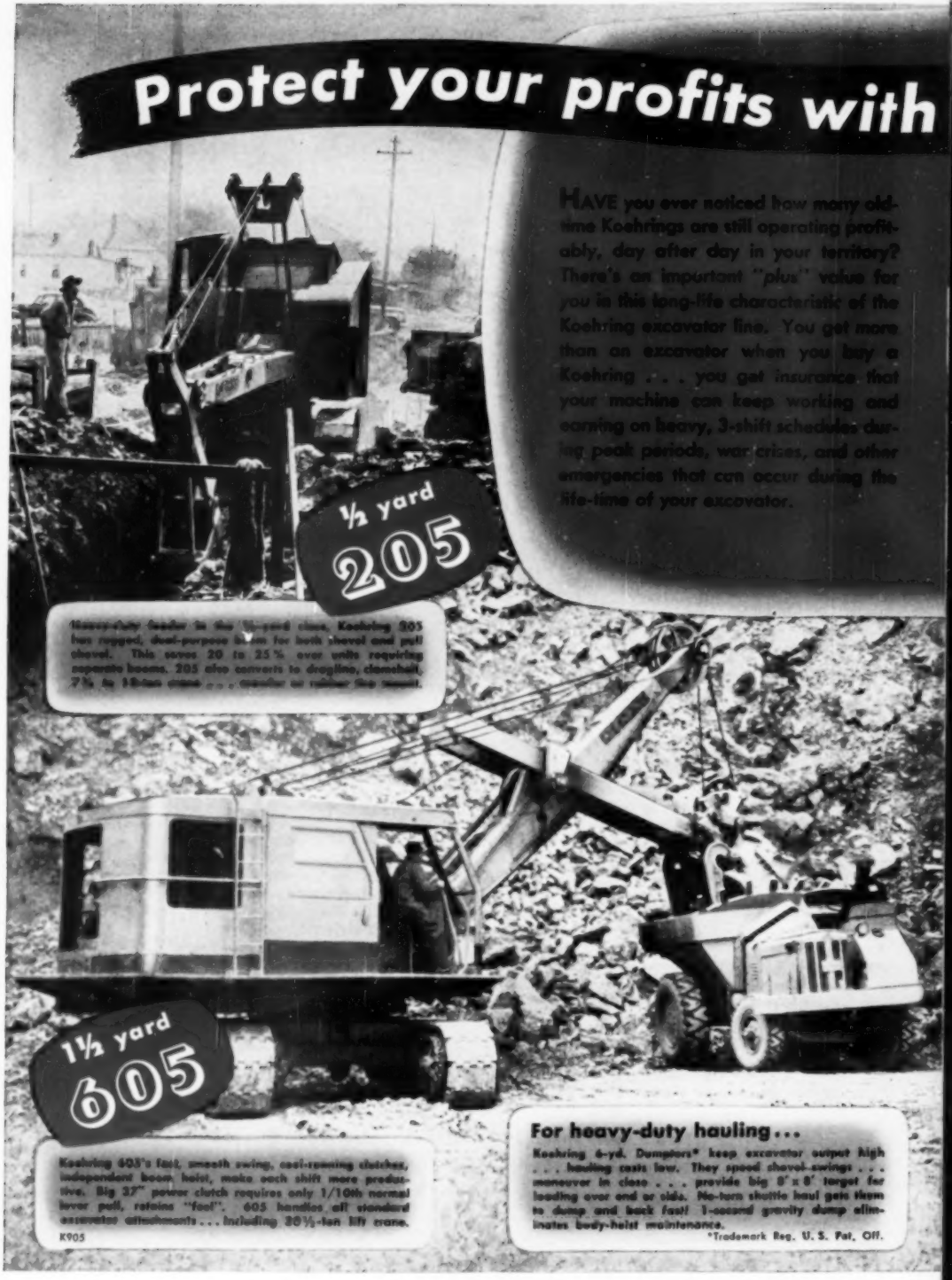
Sold and serviced by leading construction machinery distributors throughout the United States, Canada, and Foreign Countries

THE 1/3 YARD SCHIELD BANTAM

TRUCK MOUNTED TRENCH HOE • SHOVEL • CLAM • DRAGLINE • PILEDRIVER • CRANE

Protect your profits with

HAVE you ever noticed how many old-time Koehrings are still operating profitably, day after day in your territory? There's an important "plus" value for *you* in this long-life characteristic of the Koehring excavator line. You get more than an excavator when you buy a Koehring . . . you get insurance that your machine can keep working and earning on heavy, 3-shift schedules during peak periods, war crises, and other emergencies that can occur during the life-time of your excavator.



Heavy-duty loader in the ½-yard class, Koehring 205 has rugged, dual-purpose boom for both shovel and pull shovel. This saves 20 to 25% over units requiring separate booms. 205 also converts to dragline, clamshell, 7½ to 10-ton crane . . . crawler or rubber tire mount.

Koehring 605's fast, smooth swing, cool-running clutches, independent boom hoist, make each shift more productive. Big 37" power clutch requires only 1/10th normal lever pull, retains "feel". 605 handles all standard excavator attachments . . . including 20½-ton lift crane.

K905

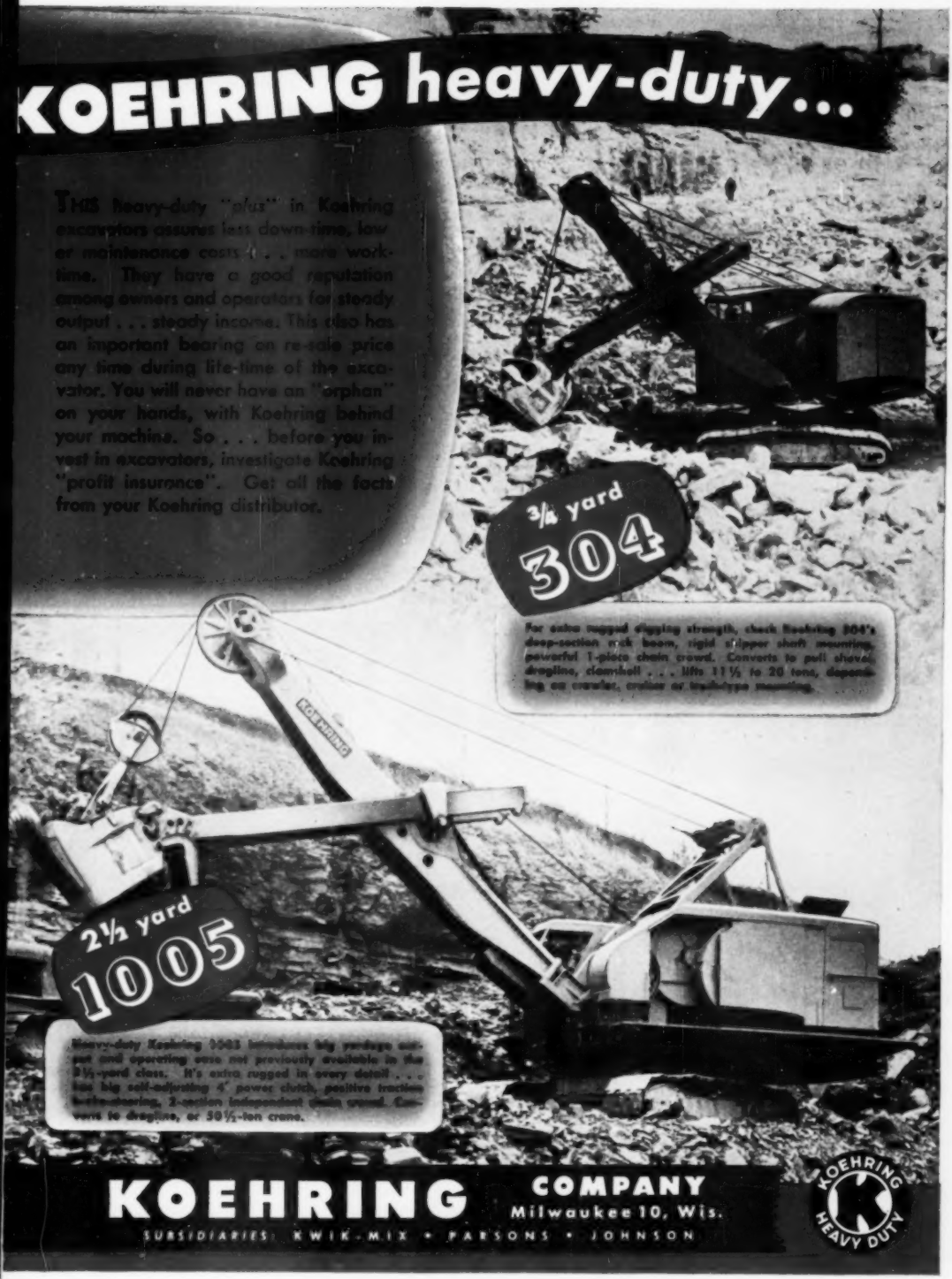
For heavy-duty hauling . . .

Koehring 6-yd. Dumpsters* keep excavator output high . . . hauling costs low. They speed shovel-swings . . . maneuver in close . . . provide big 8' x 8' target for loading over end or side. No-turn shuttle haul gets them to dump and back fast! 1-second gravity dump eliminates body-hoist maintenance.

*Trademark Reg. U. S. Pat. Off.

KOEHRING heavy-duty...

THIS heavy-duty "plus" in Koehring excavators assures less down-time, lower maintenance costs . . . more work-time. They have a good reputation among owners and operators for steady output . . . steady income. This also has an important bearing on re-sale price any time during life-time of the excavator. You will never have an "orphan" on your hands, with Koehring behind your machine. So . . . before you invest in excavators, investigate Koehring "profit insurance". Get all the facts from your Koehring distributor.


3/4 yard
304
For extra rugged digging strength, check Koehring 304's deep-section crab boom, rigid stripper shaft mounting, powerful 1-piece chain crowd. Converts to pull shovel, dragline, clamshell . . . lifts 11½ to 20 tons, depending on crawler, cruiser or truck-type mounting.
2½ yard
1005
Heavy-duty Koehring 1005 introduces big yardage output and operating costs not previously available in the 2½-yard class. It's extra rugged in every detail . . . has big self-adjusting 4" power clutch, positive traction brake-steering, 2-section independent chain crowd. Converts to dragline, or 50½-ton crane.

KOEHRING COMPANY
Milwaukee 10, Wis.
SUBSIDIARIES: KWIK-MIX • PARSONS • JOHNSON

KOEHRING HEAVY DUTY

New Equipment

Continued from page 38

with blower cone is placed over the repair area, with edges of cone about ¼ to ½ inch from the tire to allow hot air to flow freely out of cone. After the repair rubber becomes warm and soft, it is rolled down. Air-Welder is replaced over repair during remainder of the cure. Curing time is normally from one to three hours, depending on depth of the repair.

The special rubber used in the vulcanizing process is made exclusively for Schlegel by Goodyear.

Truck-Mounted Excavator

Manufacturer: Schield Bantam Co., Inc., Waverly, Iowa.

Claims: The truck mounted M-49 is convertible from shovel to trench hoe, dragline, clam, piledriver, or crane. It mounts on any 1½-ton truck chassis or larger and is also available on half-tracks.

The M-49 has an independent spur gear drive boom hoist which permits the boom to be powered up or down, or lowered on the brake.

Engineering features include Timken tapered roller bearing mounting of jack, drum, and swing shafts. Drums, swing gears, and vertical swing shaft roll on pre-lubricated, sealed-for-life ball bearings. Sealed in triple roller chain drive runs in oil bath. All gears and pinions are machine cut, and parts subject to extreme wear are flame hardened. Internal expanding mechanical clutches are used on both swing and drum shafts. Machine cut bull gear is bolted in place and can be rotated.

The ⅓-yd. machine has a capacity of 60 yards per hour as a shovel or dragline. Trench hoe will dig 100 feet of 5-ft. ditch per hour. Crane capacity is five tons.

Tilt-Type Trailer

Manufacturer: C. R. Jahn Co., Savanna and Chicago, Ill.

Claims: The 3-ton tilt-trailer JT-203 is designed to haul the Buckeye 40 ditcher, but also handles other pieces of small equipment such as mixers, compressors, and tractors. Platform height is 14½ inches which keeps the loading incline at the minimum when the platform is tilted. No jacks or loading ramp are required. An automatic safety lock holds the platform in position when loaded or empty. Other features include a 56x132-in. platform, dual wheels, and four 6.50/20 6-ply tires.

The trailer can be used behind any standard ½-ton truck with a regular pintle hook.

BUCKING and LUGGING

show what an engine's made of!

...and this new Oshkosh snow removal truck proves the power and stamina of the Hall-Scott 400

An engine that can shove around tons of snow can do a mighty good job on other heavy jobs, too . . . trucking, lumbering, quarrying, excavation work.

Read, then, what Oshkosh Motor Truck Co. has to say about the Hall-Scott 400 in the new 54,000-lb. GVW Oshkosh Model W-2206:

The snappiness of the engine permits shorter runs in bucking, due to rapid acceleration. Extra lugging power, too, permits plowing hard snow 3 or 4 feet deep without bucking.

That's the kind of power that means greater dependability . . . higher speed on grades . . . lower maintenance costs! Get *all* the facts on Hall-Scott. Butane or gasoline equipped.

HALL-SCOTT
MOTOR DIVISION
ACF-BRILL MOTORS COMPANY

Factory and Main Office.....Berkeley 2, California
Philadelphia Branch...62nd Street & Woodland Ave.

Branches: Boston New York Chicago Dallas Los Angeles Spokane Berkeley

HALL POWER BY SCOTT

IT TAKES A BAKER FOR THE MAN SIZE JOBS

It is significant that today on the BIG TOUGH JOBS you'll find Baker Bulldozers and the A-C HD-19 in the key spots . . . where the going is toughest, where big yardages must be moved fast and at lowest cost.

And it's not the color of the paint that makes Baker the favorite — it's the reputation they've been building up among experienced users — for outdozing anything in the field — for more yardage per pass — for easier operation — for rugged dependability.

These are facts that can be proved in the field, on your job. If you are still using your regular bulldozers, it will pay you to investigate this great, new Baker. See your friendly Baker Allis-Chalmers dealer today.

BAKER MFG. CO.
Springfield, Illinois

News from the Field

States Exhaust Federal Aid Funds

Virtually all Federal Aid funds provided under the 1944 postwar Federal Aid Act have been expended on new roads, according to Col. E. R. Needles, ARBA president. Out of a total authorization of $1½ billion, the sum of $1,425,394,287 has been expended for new highway construction completed or in the process of completion.

Figures of PRA show that as of Jan. 31, 1949, 68,741 miles of new highways have been built since 1945, when construction started under the program.

As of Jan. 31, the states which had completed the largest number of miles of new highways were Texas with 6,071 miles, Minnesota with 2,917 and Kansas with 2,874. Leaders in mileage of highways under construction were Texas with 1,034 miles, Kansas with 946, and Georgia with 780. Kansas leads in the number of miles under contract with 506 miles, North Dakota with 200, and Iowa with 192.

Pa. Creates Authorities To Issue Bonds

Bills providing for the creation of a State Highway and Bridge Authority and a General State Authority to issue bonds for a $215 million capital improvement program have been passed by the Pennsylvania Legislature. Under the measures the Highway Authority will be able to issue bonds up to $40 million for express highways. The General State Authority will have the power to borrow up to $175 million for general improvements including $92 million for mental hospitals and $27 million for stream clearance.

Creation of the authorities to borrow funds was necessary because Pennsylvania's direct borrowing capacity is now limited to $1 million under the state constitution.

ARBA Estimates 1949 Construction

Upward trend in postwar highway construction will continue in 1949 with an estimated expenditure of $1,233,546,000 on state and Federal Aid roads as compared to $1,111,600,000 and 33,657 miles in 1948, and $846,153,000 and 30,279 miles in 1947, a state-by-state survey by ARBA discloses.

Maintenance, also mounting steadily, is not included in the estimates. Figures show $433,603,000 for maintenance in 1949 as against $415,126,000 for 1948, and $377,181,000 for 1947. The survey breaks down the mileage as 1,526 miles of concrete, 19,716 miles of bituminous mixes and treated types, and 10,788 miles of other forms of surfacing.

Combined construction and maintenance expenditures for 1949 of $1,667,149,000 for the second successive year constitutes a new all-time high in American road building.

Here are estimated expenditures by states for 1949, along with the mileage in each:

State	Expenditure	Mileage
Ala.	$ 19,000,000	750
Ariz.	8,750,000	175
Ark.	19,500,000	350
Calif.	89,853,000	527
Col.	18,756,000	450
Conn.	25,379,000	51
Del.	6,400,000	83
Fla.	31,500,000	505
Ga.	54,000,000	960
Idaho	13,351,000	371
Ill.	56,010,000	721
Ind.	35,718,000	530
Iowa	21,830,000	825
Kan.	33,000,000	2500
Ky.	28,000,000	1150
La.	45,660,000	721
Maine	16,250,000	220
Md.	12,791,000	347
Mass.	37,979,000	79
Mich.	50,300,000	675
Minn.	30,000,000	795
Miss.	19,000,000	640
Mo.	40,800,000	1837
Mont.	7,200,000	568
Neb.	13,500,000	422
Nev.	4,250,000	177
N. H.	18,834,000	80
N. J.	37,200,000	25
N. M.	22,000,000	700
N. Y.	166,000,000	600
N. C.	72,000,000	3125
N. D.	14,500,000	640
Ohio	77,000,000	875
Okla.	25,759,000	1002
Oreg.	30,500,000	315
Penn.	103,500,000	1225
R. I.	9,600,000	30
S. C.	23,020,000	730
S. D.	13,900,000	670
Tenn.	20,059,000	631
Texas	96,000,000	4250
Utah	9,500,000	385
Vt.	6,000,000	89
Va.	52,000,000	495
Wash.	24,500,000	899
W. Va.	33,000,000	106
Wisc.	51,000,000	800
Wyo.	11,000,000	250
D. of C.	11,500,000	44
Total	$1,667,149,000	34,395

• High in Oregon hills, a 1½-yd. Koehring 605 shovel loads 1,200 cu. yd. of rock every 17½-hour day into a Telsmith feeder for surfacing a new road from Warm Springs to Portland. A Caterpillar D-8 dozer pushes down the material, keeping a supply under the shovel dipper. Rogers Construction Co., Portland, is handling the job.

Pile Driving Begins at UN Site

Steam hammer blows of 26,000 foot-pounds pressure each are driving piles along the East River in Manhattan where the permanent headquarters of the United Nations is being built on

the filled-in area of what was once Turtle Bay. Fuller-Turner-Walsh-Slattery, Inc., a group of four contractors, holds the $25 million contract with the UN for the construction of the Secretariat and the foundations for the General Assembly and Meeting Hall area. Walsh Construction Co. is driving the piles.

A 100-ton rig with an 80-ft. boom and a 90-ft. lead is used to drive 50,000 feet of 14-in. steel piling. The steam hammer suspended in the top of the lead is driven by a 60-hp boiler. A smaller rig will sink 20,000 feet of 8- and 12-in. piling. The piles are conventional H-shaped steel beams.

Piles are from 15 to 90 feet in length and are driven to form clusters of from five to 20 piles each. Each cluster is capped by concrete to form a column footing. Two such rows, totalling 110 footings, will be driven for the supporting columns of the cover and roof along Franklin D. Roosevelt Drive. Others will be sunk to varying depths at intervals to support the foundations for the Assembly, Meeting Hall area and 3-story underground garage.

The Secretariat will rest partly on bedrock and partly on concrete piers. The piers are economical only to a depth of about 20 feet, making the use of steel pile supported piers necessary elsewhere.

All told, 1,700 piles will be driven to rock to support the various foundations. It is estimated that the job will take from six to eight months.

The world capital is being built on ground where the shore line from 44th to 48th Streets formerly formed a small rock-bound cove called Turtle Bay. The rock formation which formed the steep banks of the cove, is of Manhattan schist, a coarse quartz-mica. This cover is now filled in behind a rock-filled timber crib which may have to be dug out and replaced with earth before the piles can be sunk in this area.

• Recess time will run more smoothly for the kids at a Bronx, N. Y., playground when this International-mounted Bucyrus-Erie TD-14 bulldozer finishes grading and back-filling. The job calls for a total of 300 to 600 yd. to be moved 20 to 100 feet. Ammon R. Hebb, Bronx, owns the rig.

J. L. Savage Receives Engineering Award

John L. Savage, internationally-known civil engineer is the recipient of the 1949 Washington award given annually by a joint committee of the ASCE, ASME, AIEE, American Society of Mining and Metallurgical Engineers, and the Western Society of Engineers. Savage, who is consulting engineer for TVA and the Bureau of Reclamation, received the award for "unselfish public service devoted to the creation of monumental hydraulic structures utilizing natural resources."

Among the more prominent dams in which Savage has had a direct responsibility are the Hoover (Boulder) Dam

Continued on page 48

• Road crews of Kearney County, Kans., constructed a mile of road in two hours by using these five Caterpillar diesel motor graders. The route will provide an adequate school bus road between Highway 25, an oil-top road, and an elevated gravel road near Lakin, Kans. Previously the route could be reached only through circuitous travel on the gravel road. County Engineer Jasper Myler put two 12 graders to pioneer ditch cuts and to remove sod and weed growth from ditches. A 212 handled backsloping while a 112 travelled close to the shoulder to pick up the ditch windrow thrown up by the two 12's. A 9 did the final feathering. New road grade is six inches above field level.

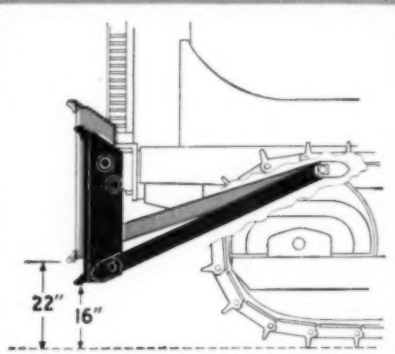
HD-19 TORQUE

OUTPUSHES

. . . On Any Job, Any Time

***Shortens* Time in Cut.** You get heaping loads fast with the BIG HD-19 pushing. A powerful, 40,000 lb. tractor with long, wide, sure-gripping tracks . . . it gets in there and really "bears down."

What's more — makes contact faster with any make or type scraper combination — no trundling along behind trying to catch up. Hangs on, too, throughout entire loading period — no losing scraper, no sudden, jarring contacts because there's no stopping to shift. Torque Converter automatically synchronizes HD-19's speed with speed of loading unit. And with a final, extra boost, gets scraper off to fill with a flying start. Result — MORE YARDS MOVED AT LESS COST PER YARD.



NEW HEAVY-DUTY, ADJUSTABLE PUSHER PLATE NOW AVAILABLE FOR HD-19. It's bigger, stronger, heavier — weighs 1,600 lbs. It's adjustable — operates at 16" or 22" above ground . . . pushes any make scraper or self-powered hauling unit.

CONVERTER TRACTOR

OUT-'DOZES

Of Year, Under Any Conditions

Shortens **Time on Every Bulldozing Job.** The heavier, sure-footed, better-balanced HD-19, working with especially matched bulldozers — plus having the advantages of the Torque Converter drive — assures greater output on bulldozing. Operator can take a deeper cut, roll bigger loads faster . . . and get back for the next pass quicker — has a high reverse of 5.5 m.p.h. Load and terrain and use of throttle govern forward speed . . . and there's no worrying about engine stalling when tractor is overloaded — keeps running, regardless.

And because the HD-19 is on tracks it can be used everywhere on the job — on wet, sandy or rocky going . . . no job too tough for it to handle. "Seeing is believing" . . . watch it outperform. Contact your Allis-Chalmers dealer.

ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

ORIGINATOR OF THE TORQUE CONVERTER TRACTOR

Continued from page 45

and power plant, Shasta Dam, All-American canal system in California, Continental Divide tunnel in Colorado, Norris and Wheeler Dams in Tennessee and the Underground Fuel Storage project at Pearl Harbor. He has worked in Afghanistan, Australia, Canada, China, India, Mexico, Palestine, Spain, Switzerland and England, and has received numerous awards in recognition of his contributions in the field of civil engineering.

On receiving the award at the Furniture Club of America, Savage reviewed the Yangtze River Dam project in China. The power distribution area of the projected Yangtze River Dam is peopled by 140 million persons. Preliminary work at the site was temporarily suspended in August 1947, because of internal strife in China. The dam will require six or seven years to build.

Twenty diversion tunnels would be needed, compared with the four used in Boulder Dam. It is estimated that the fluid capacity would be equal to 50 million acres and that the storage of flood water would irrigate 10 million acres of land. Disastrous Yangtze River floods would no longer be a threat.

In the fall of 1945, the Bureau of Reclamation entered into a $500,000 contract with the Chinese government providing that Reclamation engineers in Denver would draft the final plans with Chinese engineers collaborating.

KEEPING ABREAST OF POWER PROGRESS . . . . . .
The new TOURNADOZER is protected against dust by a
DONALDSON AIR CLEANER
Dust and 'dozers go together, which makes dust protection for the prime mover essential. On the new Tournadozers, as on most heavy-duty equipment, Donaldson Air Cleaners are given the job of providing dust-free air for the engine, in this case a Buda 6DCS-844.
New power-driven equipment such as the Tournadozer presents new dust protection problems. Donaldson research, engineering and testing facilities are at the disposal of all manufacturers in solving these problems.
DONALDSON CO., INC.
666 PELHAM BLVD., ST. PAUL 4, MINN.
DONALDSON CO. (CANADA) LTD. CHATHAM, ONTARIO
DONALDSON Oil-Bathed AIR CLEANERS
SALES ENGINEERS: CHICAGO • DETROIT • CLEVELAND

British Uganda, Egypt Plan International Dam

British Uganda and Egypt have laid plans for a huge irrigation and electricity generation scheme to begin with the construction of International Dam at Owen Falls, Jinja on Lake Victoria in British Uganda. The project will make possible an increase in the cultivable area of Egypt from 5.9 million acres to about seven million. In the Sudan (which is jointly administered by Britain and Egypt) the irrigable area will be increased from 862,000 acres to 2½ million. The scheme will also reclaim thousands of swampy acres in the southern Sudan and provide electricity for the industrialization of the British Protectorate of Uganda.

Electricity will also be supplied to parts of Tanganyika, a British trusteeship, and possibly to the Belgian Congo. The project compares in size with the TVA in the United States and Dneiper Dam, the U. S. engineered project in Russia.

The cost of the first stage, which is the construction of the dam at Owen Falls to regulate the level and discharge of Lake Victoria into the White Nile, is estimated at $48 million. The Egyptian government will contribute $16 million and the British Protectorate of Uganda, $32 million.

Six turbines, each with an output of 15,000 kilowatts, will be installed. The foundations of the dam and the turbine housings have been planned so that the height of the dam can be raised and two more 15,000-kw turbines added without reducing the flow of the Nile to Egypt, modifying the date of its arrival, or lowering the level of the river.

Venezuela State Plans $6 Million in Roads

Construction of a network of highways at a cost of $6 million has been initiated in Estado Sucre, Venezuela. Equipos, S. A., one of the largest road contractors in the South American country, has been given the contract which calls for the construction of 300 miles of asphalt-paved roads, 22 bridges and numerous culverts.

Estado Sucre, located in eastern Venezuela, has an area of 4,550 square miles and a population of 300,000. The

Rock-Crushing POWER AT ROCK-BOTTOM COST

Ada County's Universal No. 880 Master gravel plant with 24" twin dual roll crusher and No. 1024 jaw crusher, powered with a 6-71 GM Diesel engine.

Here's a rock-crushing plant that produces up to 200 three-yard truck loads a day using only 45 gallons of fuel in 8 hours. It's owned by Ada County, Idaho, and it is powered with a 6-cylinder General Motors Series 71 Diesel.

In applications like this, all over the country, these rugged 2-cycle GM Diesels are getting more work done—and getting it done for less cost. With power at every downstroke, they deliver a sturdy, dependable flow of power. They're smooth, easy to start and quick to adjust to varying load demands.

As for upkeep—it is always low because of the clean, simple design and precision manufacture found in GM Diesel engines. They are built to "take it" on tough jobs like this—are given rigid "run-in" tests. Then too, they are backed by Detroit Diesel's well-known owner service policy and the ready availability of factory engineered replacement parts.

All this makes a GM Diesel a natural for any job you may have. It's an engine you'll want to learn about, so write today for the complete story.

DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES...Up to 200 H.P. **DETROIT 28, MICHIGAN** MULTIPLE UNITS...Up to 800 H.P.

GENERAL MOTORS

DIESEL BRAWN WITHOUT THE BULK

GM GENERAL MOTORS DIESEL POWER

highway network will connect Cumana, the capital, with Carupano, Sucre's second city in size and population. The road will run along the southern shore of the Gulf of Oariace, reaching out to the borders of the States of Anzoategui and Monagas and to the oil fields of eastern Venezuela. Cumana will then become a port of northern Monagas and eastern Anzoategui.

Washington Boosts Gasoline Tax

To aid in financing an expanded highway modernization program the Washington State Legislature passed recently a bill increasing the state gasoline tax by 1½ cents to a total of 6½ cents a gallon.

Highway appropriations totaling $107,616,633 for the next two years were provided in other legislation, which will make possible a start on a recommended 15-year highway modernization program.

Of the total, over $69½ million will go to state highways, $9⅓ million to cities, and over $28½ million to counties. The total compares with $80 million appropriated by the 1947 Legislature.

31 Dozer-Shovels Work On Nova Scotia Roads

A fleet of 31 Bucyrus-Erie Dozer-Shovels mounted on International TD-9 crawler tractors are the maintenance backbone for 15,000 miles of Nova Scotia roads. The Department of Public Works and Highways uses them for general road construction, putting them on all kinds of jobs—from stripping overburden to snow removal.

Graded earth roads and unimproved roads stretch over some 7,600 miles of the northern country. The small Dozer-Shovels are particularly useful in the region because they can be easily trucked to nearly any location, used for a few days or weeks, and moved out again. They were originally chosen for Nova Scotia roadwork in 1946 to replace hand labor for loading trucks and making cuts and fills in places where the jobs were too small to move in a power shovel.

Whenever a loading unit is needed, the mobile Dozer-Shovel is loaded on any 3- to 5-ton truck platform and rushed to the site with a minimum loss of time and transportation. Sand and gravel pits use them extensively—the tractor rigs load materials at the rate of 400 to 450 yards a day, filling a truck in three or four passes. Loading is from both pits and stockpiles.

A considerable area of Nova Scotia consists of rock covered by a layer of overburden. Portable crushing plants are brought to a location where rock is needed for either maintenance or construction of a roadbed. The Dozer-Shovel is able to strip the overburden, either pushing it to the side or loading it to trucks if fill is required in another location. The machine then feeds the rock to the crushing plant, a conveyor belt carrying the rock to a hopper which in turn loads to trucks. The same Dozer-Shovel then goes ahead with the road excavation task, if any, moving 400 to 500 yards a day.

Although stripping, loading and excavating are their major jobs, the rigs also pull graders and do some crane work. The Department has also found them particularly well-adapted for bridge work in isolated places.

Road maintenance in Nova Scotia costs about $5 million a year; new construction, from $6 to $10 million. The Province is divided into nine districts each with a division engineer in charge. Every district maintains its own roads and keeps them open during

• Maintenance and construction of Nova Scotia roads are aided by these International-mounted TD-9 Bucyrus-Erie Dozer-Shovels. Here a secondary road is being widened by the rig shown dumping its ¾-yd. dipperfuls of excavated material to a Dodge truck.

• Much of Nova Scotia land is rock with a layer of overburden. The Tractor Shovels are especially useful because they can strip the land, as shown here, then load the rock for the crushing plant.

• Many road jobs in the northern province are small and widely scattered. The Dozer-Shovels were chosen because they can be transported easily and can handle a variety of operations. Here rigs load sand and gravel at a pit for a resurfacing job.

the winter months. Here again the Dozer-Shovels, at the disposal of each district dependent on road mileage and population, are especially useful—21 have been equipped with V-nose snowplows. Little construction can be done during the winter months, and the easy replacement of the ¾-yd. dipper with a snowplow gives the rig year-round efficiency.

The longest haul any of the machines have to make to any location is about 30 miles. They serve the same general purposes in all counties.

K. A. Forbes, mechanical engineer for the department, initiated the program in 1946 with the purchase of six rigs. As they proved their value in a region where small road jobs are abundant, the number was increased to 31.

Halt Tenn. Diversion

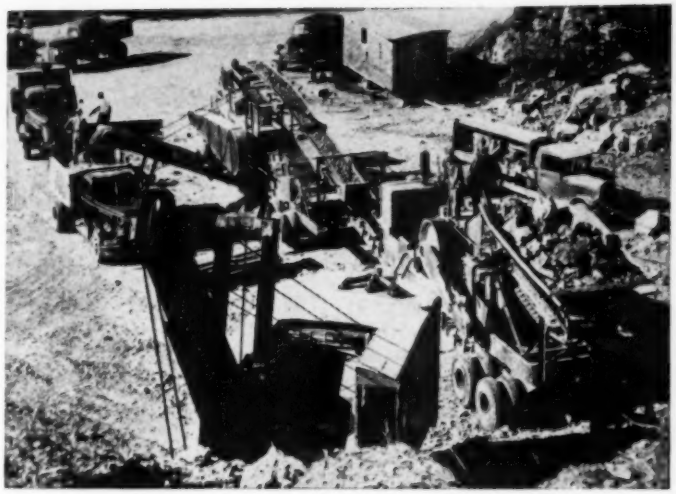
A proposed state constitutional amendment to restrict the use of automotive tax revenues to highway purposes has been given final approval by the Tennessee Legislature. It will go before the voters at the 1950 general election.

The same anti-diversion amendment was originally slated for a vote at last fall's general election, but was kept off the ballot by a technical defect.

N. J. "Borrows" From Highway Funds

A total of $19½ million of highway funds are "borrowed" for general purposes in an appropriations bill for the 1949-50 fiscal year passed by the New Jersey Legislature. The bill includes a pledge that the money will be returned to the highway fund within three years without any penalty by the Federal Bureau of Roads.

The state will get about $7 million of Federal Aid for roads and with the $18 million provided from state funds, $25 million is left for highway construction purposes. Another $12 million is provided for maintenance and personnel, making the total $37 million.



• Becker and Tuckwood's new Pioneer 2-unit portable road aggregate plant at Lancaster, Wis., is fed by a 1½-yd. Northwest 6 shovel. The plant consists of a primary unit with 36-in. x 12-ft. apron feeder and 2436 jaw crusher, and a secondary unit with 40x22 roll crusher and 4x10-ft. 3½ deck vibrating screen with split feed arrangement. The truck-mounted Chicago-Pneumatic 315 air compressor at right powers drilling operations. Crushed rock is hauled to Grant County and various township road projects by 5-yd. (clockwise in photo) Chevrolet, International, Ford and Chevrolet trucks.

N. D. Legislature Votes More Road Revenue

Provision of additional revenue for highway construction was among the major actions taken by the 1949 North Dakota Legislature.

Besides appropriating $8,350,000 from the general fund to match Federal construction grants in the next two years, the Legislature also enacted a 2-cent increase in the state gasoline tax. One-half of the revenue from the increase will go to the State Highway Department for work on secondary roads; one-fourth will go to counties for work on county roads, and the remaining fourth to counties for work on township roads.

The gasoline tax boost, from four to six cents a gallon, will go into effect July 1, but opponents of the increase announced they would attempt to block operation of the law through referendum petitions. Such petitions, signed by 7,000 voters and filed within 90 days, would keep the tax boost from becoming effective pending a vote by the people. The next election is the June, 1950, primary.

The gasoline tax boost, the appropriation from the general fund, Federal Aid, and current highway department revenues bring available funds for the next 2½ years to nearly $40 million. Added to this will be $9 million which the state will distribute to the counties for highway work as their share of the existing gas tax and motor vehicle fees.

• The Cass Co., Ogalla, Neb., used this 2½-yd. Lorain 820 dragline to excavate a 535,000-cu. yd. ditch for the Tri-County Irrigation District. The ditch, located near Ludington, Neb., varies from 8 to 18 feet in depth and has an 8-ft. bottom.

YOU'LL GET A SIDE ORDER OF PROFITS

. . . with a Bucyrus-Erie 21-W or 22-W water well drill in hand. Just the dish for contractors whose blast hole drilling requirements won't keep a blast hole drill busy full time, these versatile rigs can double for profits — handling rock preparation and then earning money on the side, on contract, rental, or water well jobs.

They can put down blast holes with the speed and power that means fast footage, and they have all the spooling capacity needed to drill the deeper holes required for water well work.

Check up on this side order of profits when you plan your new equipment purchases.

92W48

BUCYRUS-ERIE CO.
South Milwaukee, Wis.

Delta-Mendota

Continued from page 22

"pay digging" is left. Swinging less than 40° each way to dispose of the dirt, the big machine makes a pass in about 55 seconds. A swing recorder keeps a permanent record of the degrees in each swing. Excavation superintendent J. E. Ricker watches the record carefully.

Digs Out 37-ft. Section

Ordinarily a block of earth about 37 feet long is removed at one setting before the machine walks back. It travels 7½ feet at a step on its rolling cams and walking pontoons. Five steps are usually required for a move. From time to time the walker crosses some utility line. Another of Ricker's liaison jobs is arrangement with utility companies concerned so that the lines can be bypassed and re-connected after the machine has gone by.

For all practical purposes, the walker is doing a finish job with its 15-yd. bucket. Excavation orders are to leave about 12 inches of dirt on the side slopes and about seven on the canal bottom, to be removed later on by the special trimmer. In order to insure this result, a company surveyman works on one shift with the walker, running cross sections directly behind the machine. He uses a surveyor's instrument level rather than a hand level for greater accuracy.

Working with the surveyman is a Caterpillar D-8 bulldozer. It is the job of this machine to scoop up loose dirt left behind, or perhaps a little high and bring it up again within reach of the walker's bucket. To make this blade more efficient for this special work, it was shop-altered by turning the sides of the blade forward about 12 inches. This prevents side spillage of dirt when the blade is full. It gets to the dragline bucket with all its load.

This bulldozer also works on the side slopes and shapes them to a little finer grade, if possible. But the special care used by the dragline operators makes the sloping job a minor one.

As the dragline finishes its work a Caterpillar No. 12 motor grader moves in speedily and blades the berm at the top of the canal to true grade. This is done on both sides of the canal to make way for the rails which carry the special canal trimmer.

Rails are being set by the Condick Co., Berkeley, under a subcontract.

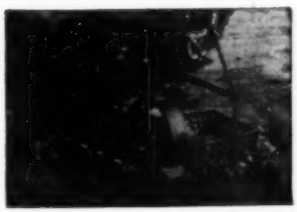
Contractors Say:

OMAHA DRAGLINE BUCKET

Tops 'em All!

IN PROFIT AND PAYLOAD

"I know this because I have seen Omaha Buckets on the job. In all kinds of digging there's a full load every cast with an extra payload built in. On the job and on the job record, Omaha Buckets pay off with a profit."



Write for complete catalog.

The know-how of many contractors and engineers has been built into Omaha Buckets. Surplus weight has been eliminated to increase the total load. Extra strength is designed for the tough digging jobs. Performance records show Omaha Dragline Buckets Tops 'Em All.

DRAKE-WILLIAMS-MOUNT • OMAHA, NEBR.

The rails are standard railroad steel in 39-ft. sections, bolted to 6x8-in. timber ties, four feet long. The sections are picked up by a Bay City Crane-Mobile, moved by a flat bed truck, and set with the help of the crane. The truck crew hooks and unhooks the sections leaving the actual lining and shovel tamping to a 7-man labor gang. Altogether 3,400 feet of rails will be put down to handle the machines in the paving lineup. These rails, about 110 feet apart, have to be set in place with a great deal of care, because the special machines which they support weigh as much as 150 tons.

The first of the machines in the lineup is a special canal trimmer, custom-made for the job by the Stockton, Calif., firm of Gunnert and Zimmerman. The machine weighs 150 tons, is 36 feet high, 110 wide at the top. It tapers down to fit the 48-ft. canal bottom.

Trimmer Removes Excess Dirt

Two endless dragbucket lines and conveyors are mounted on the basic structure—a heavy framework of steel. Both bucket lines originate at the bottom of the machine near the center point, and work opposite each other. The buckets scoop up excess dirt, travel up the canal slope, and dump into cross conveyors. These, in turn, discharge, to a main stacker conveyor which leads off to the side on a 25-ft. high boom, spilling the waste outside the canal.

Both bucket lines are driven by Caterpillar D-8800 diesel engines and a D-7 Caterpillar final drive. Conveyor power and motive power for the trimmer are furnished through electric motors by a Caterpillar diesel-electric generating unit mounted amidship on the trimming machine. Four Rodgers hydraulic jacks, one at each corner of the rig, can be adjusted to keep the machine level. Tight piano wires, supported at 25-ft. intervals on steel cross pins, are used as a constant line and grade reference. A pointer from the framework of the machine travels along this taut wire, and a man at each side of the trimmer tends these jacks at all times to keep the machine true to grade.

One of the serious problems in the use of the canal trimmer has been that of getting the wide contrivance around the curve where one side of the machine must travel faster than the other. This problem was solved by making the drives independent and variable;

Why users prefer the new LaCROSSE *Spring-Mounted* DF6C

FRANK MASHUDA CO., MILWAUKEE, *says:*

"We've found our 24-ton LaCrosse DF6C much easier to handle than solid axle trailers. Spring mounting also gives improved riding . . . better road bearing . . . permits higher speeds with less tire wear for comparable loads and mileage."

H. B. CHURCH TRUCK SERVICE CO., BOSTON

"Higher travel speeds without jolting the load sold us on LaCrosse spring-mounting. Our 19-ton DF6C easily carries 12,700 bd. ft. of lumber per trip on 40-mile hauls . . . also saves time loading and transporting all kinds of heavy bulk loads.

YOU, TOO, can move big loads faster, easier, at less cost with LaCrosse *spring-mounted* trailers. 19 to 33-ton capacity . . . flat, drop or low drop designs. Also standard low beds from 8 to 67-ton cap.

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☐ I may be interested in this type trailer about..... (date)

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Name..... Title.....

Employed by.....

Address.....

City..... State.....

LaCROSSE

Low-Cost TRAILER TRANSPORTATION

the operator now can watch the outside of the curve and control the speed of the machine accordingly.

The special trimmer is removing the excess material purposely left behind by the walker. A neat, even grade is the result. Excess dirt dumped off the 30-in. stacker conveyor is smoothed down by a Caterpillar D-8 bulldozer to make a haul road—a minimum 25-ft. roadway—on that side of the canal for other paving equipment to follow.

A special paving liner, weighing 150 tons, follows in the wake of the trimmer, placing the equivalent of a half mile of 4-lane highway every day. Also from the Stockton shops of Gunnert and Zimmerman, the machine is one of the largest ever built. It lays an 800-ft. uniform blanket of concrete every eight hours, working five 8-hour shifts each week.

The rig consists of a receiving hopper amidship, two electric-powered distributing cars, and a slotted opening across the machine connected to a slipform base by 25 down spouts eight inches in diameter. Power for all functions of this machine is electric, furnished by a Caterpillar diesel-electric set on board. It has the same propulsion apparatus as the trimmer, with jacks at the corners.

20 Trucks Haul Concrete

Dry batches of concrete are hauled from the job batch plant five miles away by an average of 20 trucks. Each one hauls from three to six 1⅓-cu. yd. batches. These are dumped to the skips of two dual drum pavers, one a Rex and the other a Koehring. After a 1½-minute mix with water from International tank trailers nearby, the concrete is dumped direct to a traveling transfer hopper mounted on rubber tires and towed ahead with the lining machine by the lead paver.

A conveyor belt 30 inches wide takes the concrete from this hopper and deposits it in the main storage bin on the machine, from whence the small electric cars distribute it over the forward end.

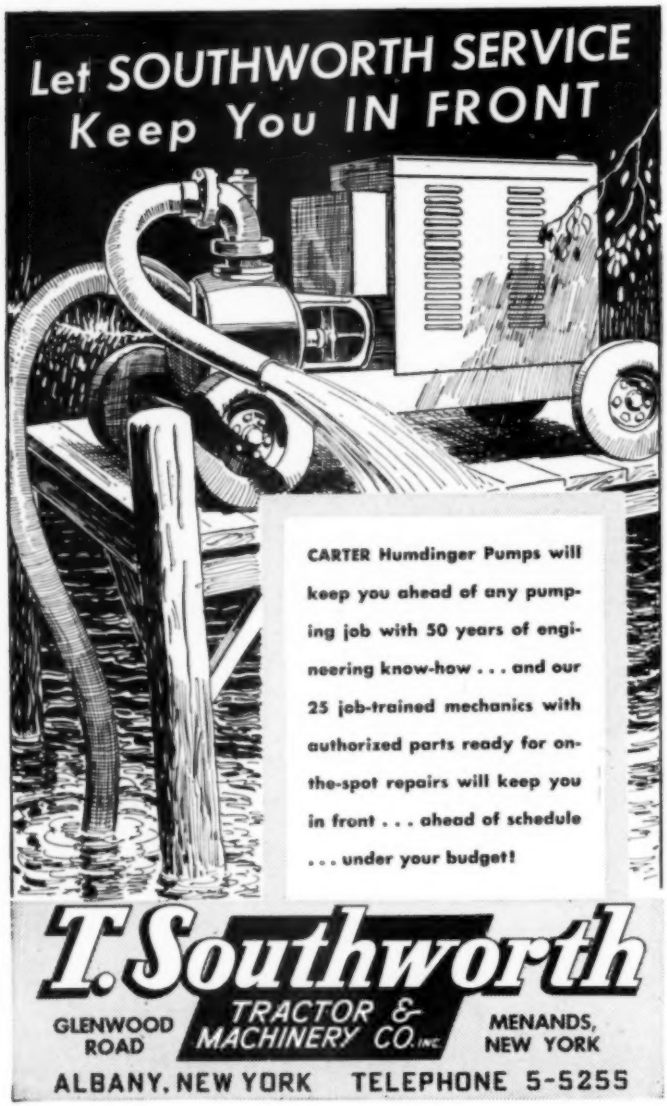
Sides and bottom of the canal are being lined with a 4-in. coat of plain concrete, without reinforcement. This moving concrete plant lays a 3-directional, 114-ft. slab of concrete. A total of nine longitudinal warping joints, filled with Mastex joint filler, are located in the banks and in the bottom. These are then criss-crossed by similar transverse joints at 12-ft. centers, giving the regular appearance of a checkerboard pattern of square concrete blocks.

As the lining machine moves forward, its immense weight tends to flatten the concrete out under the steel slipforms. This is aided by internal vibrators, controlled by the operator of the machine.

A steel trowel finish is put on from the back end of the liner and from a special finishing jumbo just behind. Steel knives under the liner frame cut the longitudinal joint grooves while the transverse ones are cut by hand from the finishing jumbo.

Final machine in the lineup is a curing jumbo from which is applied the mastic joint filler and the white pigmented curing membrane. The total crew for the concrete operation numbers about 40 men, 14 of whom are cement finishers.

Ordinarily when special machines such as these reach a dead end, or have to detour around a highway, they have to be dismantled, trucked ahead, then re-assembled. On this project the ma-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Keep You IN FRONT
CARTER Humdinger Pumps will keep you ahead of any pumping job with 50 years of engineering know-how . . . and our 25 job-trained mechanics with authorized parts ready for on-the-spot repairs will keep you in front . . . ahead of schedule . . . under your budget!
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chines were all moved ahead in an unusual feat of rigging.

M-K believed a method of transporting the 150-ton machines intact could be devised. They thought that the machines could be hauled bodily by loading one end of the bottom on a low bed trailer, and trailing the other end on special dollies.

Two sets of trailer dollies with 16 rubber tires under each unit were made up. Access ramps were built true to grade and perfectly smooth because the load was so high that the least overbalance would most likely prove disastrous. The trimmer and liner were raised by jacks to get the dollies and the low bed trailer in position. Then the first machine was lowered to position, its narrow bottom supported on the moving units, its wide top overhanging everything.

The scheme worked perfectly. The base of the machine was well lashed down with tie chains, and two cables from the truck held the load snug. Both rigs were moved without mishap saving many valuable man-hours. Bigge Drayage Co. made the first move; Condick did the rest.

Project Personnel

Field forces who handled the first job and who are moving the second rapidly toward completion include W. J. Darkenwald, project manager; D. G. Hall, general superintendent; George Adair, concrete superintendent; Art Gray, project engineer, and Frank J. King, office manager. The three men who operate the walker are Glen Van Landingham, Bob Wooden and Harold Hindman.

For the Bureau of Reclamation, the project is headed in the field by George Imrie, resident engineer; O. G. Boden, construction engineer; Oliver Folsom, field engineer, and Dee Wren and Jack Welsh, senior inspectors.

Completion of the M-K-Hasler contract will advance the big ditch nearly 23½ miles toward its ultimate destination at Mendota. Another contract has recently been let for 15 miles. The Tracy pumping plant is 40% completed, with its building expected to be finished by the end of this summer.

Expected date of completion for the entire Delta-Mendota Canal is roughly 1951. Excavation will total about 40 million cu. yd. by that time. It can't come an hour too soon for the supply of underground water is now so short that the situation is critical.

Portable Power

Continued from page 23

crossed without serious difficulty. Several sets of telephone, telegraph, and power transmission wires had to be raised or disconnected and then replaced to allow passage of the rig and its 80-ft. boom.

Two bulldozers worked ahead of the dragline to prepare a temporary road where needed.

According to Al Ross, Park Coal superintendent, it would have required 12 men working three weeks to dismantle, transport, and reassemble the 115-ton machine if the distance had not been walked. The dragline takes four 6-ft. steps a minute.

Park Coal Co. is owned by C. G. and L. M. Cooley of Denver, who also have coal stripping operations at Colorado Springs, Longmont, Colo., and Lehigh, Okla. They have an interest in the Edna Coal Co. at Oak Creek, Colo., where L. M. Cooley is manager. This is the state's largest coal strip mine.

Provides Performance Never Before Attainable In Small Type Excavating Equipment

Model 310 General ¾ Cu. Yd. Power Shovel.

Among the numerous advantages of this new type, crawler mounted GENERAL are 100% air control of basic motions through an air actuated, finger touch lever system . . . "Air Cushion Clutch" on reversing and retract mechanisms . . . bigger, easier operating brakes . . . larger shafts and liberal use of anti-friction bearings . . . deck gears recessed, fully enclosed, and running in oil . . . live, independent, worm driven boom-hoist with power up and power down for Crane, Dragline, and Clamshell service . . . independent travel, two speeds in either direction, steers without stopping . . . drumshaft operates in anti-friction bearings and end is capped with a lifetime, dustproof, GENERAL designed seal.

The GENERAL MODEL 310 is available with independent chain crowd shovel boom assembly, with crane boom for clamshell, dragline, and hookblock work, and as a hoe. Boom assemblies can be changed with a minimum of effort in the field.

●

These new features with the many others provided on the Model 310 give you increased earning power which will pay for the cost of the machine in a very short time. Write for complete details.

POWER SHOVELS • CRANES • DRAGLINES • CLAMSHELLS • BACKHOES • PILE DRIVERS

THE OSGOOD CO. O-G THE GENERAL CO. EXCAVATOR

MARION OHIO

DIESEL GASOLINE OR ELECTRIC POWERED • ⅜ TO 2½ CU. YD. • CRAWLERS & MOBILCRANES

"SETS PIPE AS FAST AS BIG MACHINES — AND SAFER"

Says Milwaukee Contractor

"Bucyrus-Erie Hydrocranes set pipe just as fast as big machines and are safer for trench workers because of their precision control," says D. R. Tomasini, partner in the contracting firm of Tomaro, Carle and Tomasini, Milwaukee, Wis. "Our Hydrocrane has set thousands of feet of pipe in the past two years at the rate of 200 to 300 feet per day — sewer pipe ranging from 15 to 36 inches in diameter — water pipe from 6 to 16 inches. In addition, we use it with a clamshell bucket for digging pipe trench, ditching for culverts, and for loading material in the yard.

"Our Hydrocrane proved a real money saver on the big 3rd Street widening job. Water pipe had to be set between two lines of gas pipe. Only the Hydrocrane was able to dig between the pipe. Without it, expensive hand labor would have been needed. It's a mighty handy rig for tight quarters."

The truck-mounted Hydrocrane travels up to 50 m.p.h. on good open highway. It is fully hydraulic, simple to operate—hand levers only. Compact — works in close quarters and under overhead obstructions. Hydrocranes have wide utility — are available with clamshell bucket, grapple, trash bucket, magnet, and catch basin bucket. Two models — ¼ yard, 2-ton H-2 and ⅜ yard, 3-ton H-3. Send the coupon today for full details.

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Gentlemen: I want the full story on the Hydrocrane.

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NOT in the *Contract*

A committee was appointed by a magazine to study the question of how best to hold a wife, and a selected list of husbands was written to. The only reply received was from a certain place of detention. It stated briefly: "I found the best way was around the neck, but it should not be overdone. Please note change of address."

"Why did you go to Dr. Frost?"

"Well, Dr. Smith has '10 to 1' on his door and Dr. Frost has '3 to 5.' So I took the favorite."

"Pa, what does it mean by 'Diplomatic Phraseology'?"

"My son, if you tell a girl that time stands still while you look into her eyes, that's diplomacy. But, if you tell her that her face would stop a clock . . . "

Film Star (newly wedded): "And is this your home?"

Bridegroom: "It is, precious."

Film Star: "Say, it looks mighty familiar. Are you *sure* you haven't been married before?"

Kind Old Lady: "You should cheer up your little brother and make him stop crying."

Boy: "I'd like to see you try to cheer up anybody who's just eaten four bananas, three hot dogs, four ice cream cones and a bag of peanuts!"

Nurse: "It's a boy!"

Sultan: "Curses— I wanted a girl."

Nurse: "Be patient, oh, King. There will be three more this afternoon."

"You remember when you cured my rheumatism a couple of years ago, Doc?" asked the shovelrunner, "and you told me I should avoid dampness?"

"Yes, that's right," replied the doctor approvingly.

"Well, I've come to ask you if it's all right to take a bath now."

"Why do you wear rubber gloves when cutting hair?" asked the customer.

"For the purpose," replied the barber, "of keeping our celebrated hair restorer from causing hair to grow under my finger nails."

Agitated Surveyor: "An alligator just swallowed one of your children."

Mammy (calmly refilling her pipe): "Well, suh, ah wouldn't be surprised. Ah was tellin' Rastus las' night sumpin' must be gettin' dem kids."

Grade Foreman: "Do you think you are really fit for hard labor?"

Applicant: "Well, some of the best judges in the country have thought so!"

New Circus Actress: "You know, sir, this is my first job in a circus. You'd better tell me what to do to keep from making mistakes."

Manager: "Well, don't ever undress in front of the bearded lady."

Wife: "It's a bottle of hair tonic, dear."

Contractor: "Oh, that's very nice of you, darling."

Wife: "Yes, I want you to give it to your typist at the office. From the looks of your coat, her hair must be coming out badly."

Wife: "Wasn't it disgusting the way those men stared at that girl getting on the train?"

Contractor: "What train?"

Cop: "Where's the fire?"

Pretty Speeder: "In your eyes—you great big gorgeous motorcycle policeman!"

Visitor: "Well, Joe, how do you like your new little sister?"

Joe: "Oh, she's all right, I guess; but there are lots of things we needed worse."

"And how is your husband getting on with his reducing diet?"

"You'd be surprised—that battleship he had tattooed on his chest is now only a rowboat."

Project Super's Wife: "Ah, Mrs. Miles, one half of the world is ignorant of how the other half lives."

Housewife: "Not in this town, ma'am."

"Oh, Fred, the baby has swallowed the matches! What shall I do?"

"Here, use my cigarette lighter."

"Cut the stalling, Jackson! The shovel dug that hole while you were standing there day-dreaming!"

• The Dallas, belonging to Franks Dredging Co.—who, with the Newport Dredging Co., held the several contracts for pumping silt from the area under construction—moves into the bay. Dredges each averaged 6,000 to 8,000 cu. yd. every 24-hour day.

San Diego

Continued from page 30

family, bluish grey in color, is used in the jetty. Quarried at Mission Gorge, 16 miles east of San Diego, its stones exceed the required weight per cubic foot by five pounds or more. Macco pioneered the quarry, building mile-long haul roads down to it from the paved highway. To facilitate traffic, empty trucks go down one road while loaded trucks go out the other.

The rock has no rift or grain and it is almost impossible to tell how it will break. The main quarry problem has been to obtain as many large stones as possible, keeping down the production of waste stone or more stone of one required class to a minimum.

To loosen rock, four coyote holes, four feet wide by five high, were driven into the mountainside. Gardner-Denver drills mounted on jack bars and Ingersoll-Rand Carboloy bits were used for driving coyote holes. An Ingersoll-Rand D-55 wagon drill and a Gardner-Denver wagon drill are used for regulation blast holes when needed. Air is supplied by Gardner-Denver compressors.

• Left: Men standing on jetty are dwarfed by the rocks used in its construction. Stones weighing 12 tons and more are used to armor and anchor the seaward end of the jetties.

• Below: At low tide Caterpillar D-7 dozer pushes sand out of the jetty path. The rig was hosed off with fresh water each time it was taken out to avoid serious damage by salt water.

Use Slow-Burning Powder

Because a slow burning powder is desirable when stone should be lifted and cracked but not shattered, the holes were loaded with heavy charges of Hercules 40 and 60% black powder. The usual method of cross cutting at the end of the tunnel was followed. Holes 1, 2, 3, and 4 were loaded with 9,000, 20,000, 30,000 and 40,000 pounds of powder respectively. The four bores, totalling more than 1,000 feet, used nearly 50 tons of explosive. An estimated 200,000 tons of rock came down with the blast, about two tons per pound of powder used. Stone is loosened and freed by secondary shooting with Hercules black powder.

A fifth hole will use 100,000 pounds of powder to break up 200,000 tons of

rock. The company has its own powder magazine, a steel quonset building which can hold four carloads.

Pay rock is loaded to a fleet of 19 of Stringfellow's trucks by two 2½-yd. Northwest 80-D shovels and a 1¾-yd. Bucyrus-Erie 43-B, the latter also used for mucking. The exceptional hardness and abrasiveness of the rock wears out shovel points in a hurry. Macco uses Morgan, Esco and Jiffy quick change shovel points.

Four 18-yd. Athey side dump wagons are used for stockpiling large stone and removing waste. A Caterpillar D-8 dozer equipped with cable elevator control and a hydraulic hookup operates the dumping gear on the Atheys. Three International K-8 trucks are used for waste removal.

General superintendent is L. W. Jones; quarry foreman, Earl Addington; powder foreman, Oscar D. Goddard; master mechanic, Bob Neely, and office manager, Bob Hails.

Stringfellow takes the rock as it leaves the shovels. All the trucks—12 Fords, four Chevrolets, and three Internationals—are 8-yd., 10-wheel dumps, with the exception of three Autocar flatbeds which are used for extremely large stones. The quarry rock breaks with sharp jagged edges, hard on truck bodies. To protect the beds, 2x12 planks over which are fastened ¼-in. steel armor plate are laid on the floors. Heavy "L" bars, welded to the sides of the trucks, keep the bodies from spreading. Truck frames are reinforced with heavy steel fish plates.

A government checker and a company representative weigh all loaded trucks on a Fairbanks 80,000-lb. capacity scale as they leave the Macco quarry. The 16-mile round-trip haul takes 1¾ hours. Five or six round trips per truck are the daily average.

The best day's work saw the hauling and placing of 1,380 tons. Working a 5-day week, 9½ hours a day, 19,000 truck loads or 190,000 tons of rock had been placed by last January.

The tide channel at the bay entrance is narrow and the tide stream swift. The government engineers decided it was necessary to lay the jetty footings at an elevation well below a point likely to be eroded or eaten away by sea

THEY
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on ROGERS TRAILERS
Everyday Everywhere
MORE AND BIGGER LOADS
An impressive number of the biggest contractors TODAY repeatedly put their confidence in ROGERS TRAILERS long proven ability to "deliver the goods" and "stand the gaff" over long periods of heavy usage.
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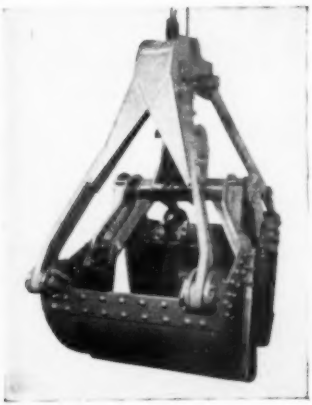
136 ORCHARD ST. ALBION, PENNA.

ERIE BUCKET CATALOG *Shows*



Gross Loads for 43 Standard 2-Line Buckets in 9 Materials

Write for a copy of Catalog 2L-2. Compare your present bucket performance to see if you are getting the most from your crane. Or send us size and make of crane and materials handled, giving present bucket output. We'll give you Erie's proved bucket performance for your crane.

Erie makes 4 standard types of 2-line buckets in 43 sizes.

ERIE
STEEL CONSTRUCTION COMPANY
495 GEIST ROAD • ERIE, PENNSYLVANIA

action. This called for excavating the sand from the path of the jetty to elevation mean lower low water. Excavating must be done at low tide, and it is useless to dig out an area greater in volume than can be filled with rock during the next 24 hours. Twenty-three thousand cu. yd. of sand have been or will be removed from the jetty footings.

A Caterpillar D-7 dozer excavates the sand. Serious damage by salt water is avoided by hosing off the machine with fresh water each time it is taken out. Sand is pushed beyond sides of jetty at low tide and is disposed of by tidal action during high tide. A ¾-yd. Allis-Chalmers skip loader is also used on this job to build and maintain roadways.

Stringfellow works in close conjunction with the tide at all times. Excavating is done at low tide and footings laid out as far as possible while the larger stones, or armor rock, are laid down as the water comes up. All armor rock must be laid in such a way as to bind and lock one stone with another. As a result, none of it can be placed while the working area is under water. It is imperative that the crane operator be able to see his work.

Work on the middle jetty proceeded from two points. A Northwest 80-D crane with a 2½-yd. bucket and a 1201 Lima crane with a 3½-yd. bucket place the stones. At present, the Lima is working alone at the seaward side of the jetty. Emsco orange peel buckets handle stones up to six tons; larger ones are lifted and placed with a McCaffrey rock hook. Chet Pennington superintends the job.

No contract has been awarded, and work start for the third jetty has not been scheduled. Its specific purpose will be to prevent the tide channel from sanding up. When it is completed, the bay channel will be moved and caused to flow between it and the middle jetty. The present tide channel will then become the flood control and outlet channel for the San Diego River. With a discharge capacity of 115,000 cfs, this river channel will be 800 feet wide and 3.3 miles long.

Tide channel and river control is under the direction of Col. A. T. W. Moore, U. S. Army Corps of Engineers, Los Angeles district. Gordon A. Lilley is resident engineer. The overall plan of the project was devised by the City Planning Department of San Diego.

4 days' work! now done in 3 with JAEGER "air plus" pressure*

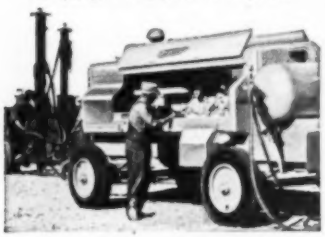
Model 125 — Runs 2 heavy or 3 medium breakers or heavy rock drill at full 90 lbs.

*With steady 90 lbs. pressure, instead of 70 lbs., air tools hit enough harder and faster to do 30% to 40% more work in the same number of hours.

Jaeger's new standard ratings (the first increase in the industry since 1932) give you the air you need to run today's big tools at steady 90 lbs. pressure — 75 ft. of air instead of 60 — 125 ft. instead of 105 — 185 ft. instead of 160 — 250 ft. instead of 210 — 365 ft. instead of 315 — 600 ft. instead of 500.

If you're interested in cost-cutting — producing 4 days' work in 3 — put a Jaeger Air Plus on your next job.

Model 600 — Runs 2 big 4" wagon drills at 90 lbs., drilling 30% to 40% more footage than you get with any 500 ft. compressor.



See your Jaeger distributor or write

THE JAEGER MACHINE CO.

Columbus 16, Ohio Cable: BIGANLITLE

Sauerman LONG RANGE MACHINES

Sauerman Slackline Cableway lifting gravel from 100 ft. under water

Sauerman Power Scraper working with portable screening plant

Dig, Haul, Dump at lowest cost!

MANY jobs of earthmoving, surface mining and stockpiling can be simplified and a great deal of money saved by using either a Sauerman Power Scraper or Slackline Cableway because in this way you combine digging, hauling and disposal of materials in one operation.

First cost of a Sauerman machine is reasonable, maintenance expense is small, and the simplicity of operation permits easy one-man control of even the largest installation.

This equipment is flexible and is readily adapted to meet new conditions. Sizes range from small portable units designed for cheap handling of a small hourly tonnage up to powerful machines that will move as much as 1,000 tons per hour of tough materials.

Write for catalog and see how Sauerman machines simplify difficult jobs.

Sauerman Bros., Inc.

574 S. CLINTON ST., CHICAGO 7, ILL.

Tractor History

Continued from page 27

tor. There was a counterweight at the back, but no provision for controlling the blade height while in use. Refinements initiated by hundreds of others have led to the precision bulldozer attachments today.

The power output of diesel engines has been increased without corresponding increase in size or weight. Horsepower per ton weight in tractors, therefore, has gone up, particularly in rubber-tired tractors designed for off-the-highway hauling of big payloads and dependent on auxiliary equipment or push tractors for loading.

Pictured in this article is someone's dream of a radical departure in earth-moving equipment, as presented in an advertisement of Bohn Aluminum & Brass Corporation. This is an all-in-one machine to grade, base and lay down a new concrete highway like toothpaste behind it. We hardly expect tractors and allied equipment to come to this, but we do feel sure that the next 50 years of progress will make our tractors of today look as crude as the creations of 50 years ago now look to us.

FAMOUS EXAMPLES OF **ARMORED CONSTRUCTION**

1. THE CIVIL WAR "MONITOR"

Extended, heavy steel side plates protect sheaves
Heavier pins and axles
Tough steel reinforcing straps
Oversize forged steel hook and shackle

2. AMERICAN DIAMOND SHELL BLOCK

9301

Dropped, slammed and battered on the job, blocks and sheaves have to be *tough!* Compare AMERICAN *"armored construction"* . . . see why these blocks and sheaves serve better, last longer. Many types, all sizes, from 1½ to 250 tons, for wire rope only. Sold by distributors everywhere. Made by AMERICAN HOIST AND DERRICK Co., St. Paul 1, Minn.

ALSO MAKERS OF THE AMERICAN HANDIWINCH AND GENUINE CROSBY CLIPS

ASK FOR **AMERICAN BLOCKS AND SHEAVES**

DIG REAL DIVIDENDS!

WELLMAN

Williams Type

Welded Buckets

Operators prefer the Wellman Bucket for its balance, easy handling, and digging power. Owners prefer the Wellman Bucket for its bigger payloads, lower maintenance cost. These features are not accidental. Wellman pioneered in welded construction of rolled steels which make these buckets lighter, stronger, for greater yardage at lower costs. In all types and sizes, you'll do better with a Wellman!

There's a Wellman Bucket for every service

THE WELLMAN ENGINEERING COMPANY
7002 CENTRAL AVENUE CLEVELAND 4, OHIO

New trade literature

Title: **Oil Inspection Circular**

Subject: A new circular, No. 300, "Required Equipment for Lubrication Control," illustrates a portable oil inspection kit recently introduced on the market. It explains the methods for measuring asphaltic and other deposit forming contaminants: dirt, metal particles, other sediment and water; acidity showing whether or not corrosion is possible, and changes in viscosity due to fuel dilution and other causes.

Where to Get: Gerin Corp., P. O. Drawer 653, Red Bank, N. J. (Free)

Title: **Diesel Engine Bulletin**

Subject: A new bulletin describes the Nordberg 4FS-1, 4-cycle, 1-cylinder, 4½x5¼-in. diesel engine. It describes and illustrates three models of this engine, explaining the lubrication, fuel system, governor, cooling system and starting. Specifications are also given.

Where to Get: Nordberg Mfg. Co., Milwaukee 7, Wis. Ask for Bulletin 165. (Free)

MANGANAL

Thrives on IMPACT and ABRASION

use MANGANAL

(Trade Mark Reg. U. S. Pat. Off.)

11-13½% MANGANESE-NICKEL STEEL

WEDGE BARS

Teeth reprinted with WEDGE BARS after 3 weeks service quarrying limestone.

for Repointing Worn Shovel and Dipper Teeth

Teeth reclaimed with Manganal Wedge Bars actually grow tougher in use! Manganal work hardens under impact and abrasion to 550 Brinell. You save time and money, too, with this easier repair method. It is much faster and costs less than the method of depositing layers of weld metal. 8 hot rolled sizes, 13 cast sizes. Tensile strength up to 150,000 p.s.i. For stronger, longer lasting teeth, repair with Manganal Wedge Bars.

FREE: Write for your copy of the "Manganal Marketer" today!

STULZ-SICKLES CO.

SOLE PRODUCERS

91 N. J. Railroad Ave. Newark 5, N. J.

NAME OF NEAREST DISTRIBUTOR ON REQUEST

Title: **Hose Couplings Brochure**

Subject: A new booklet describing and illustrating types of Le-Hi hose couplings for use with air compressors, pneumatic tools, rock drills, pumps, pile drivers and other equipment used on construction jobs has just been issued.

Where to Get: Hose Accessories Co., Lehigh Ave. at 17th St., Philadelphia 32, Pa. (Free)

Title: **Belting Manual**

Subject: A new 24-page manual on a 1949 line of conveyor and elevator belting includes data on carrying capacities, approximate belt weights, the selection and application of elevator belts. Engineering and construction details of all types of belts for such operations as coal and iron mining, stone, sand and gravel handling are described.

Where to Get: New York Belting & Packing Co., Passaic, N. J.

Title: **Apron and Reciprocating Feeder Bulletin**

Subject: A new 8-page bulletin describes apron-type and reciprocating type feeders. It gives detailed descriptions and specifications on the line of feeders, graphically showing their operation and use in typical installation photos and diagrams.

Where to Get: Iowa Mfg. Co., Cedar Rapids, Iowa. Ask for Bulletin FE-1.

Title: **Trailer Information**

Subject: A 4-page, 2-color bulletin gives specifications of heavy-duty self-loading floats. It also tells the story of the much-moved Egyptian obelisk now standing in St. Peter's Square in the Vatican. It compares the length of time taken to move it with ancient methods with that required with the equipment described in the bulletin.

Where to Get: Hobbs Mfg. Co., 609-623 N. Main St., Fort Worth, Tex.

More Dirt Moves Faster When

OWEN BUCKETS

swing over dump trucks

This claim is strongly substantiated by the increasing numbers of excavating contractors who have standardized on Owen Buckets to "Insure a Bigger Day's Work".

Long popular, Owen design and construction characteristics make for consistent "ease of operation" with "A Mouthful at Every Bite" and a clean and rapid discharge.

THE OWEN BUCKET CO. 6095 Breakwater Ave., Cleveland, O.

BRANCHES: PHILADELPHIA • CHICAGO • BERKELEY, CALIF.

A MOUTHFUL AT EVERY BITE

TO ADVERTISE: All advertising in this section is payable in advance. Rate: 60c per line, or $7.20 per inch of 12 lines. Minimum charge $2.40. No discounts; no commissions. Please count your copy carefully to avoid delay. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Be sure to enclose the correct amount of money with your order. Closing date — 15 of preceding month. Example: January closes December 15th.

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

LARGE SHOVELS, CRANES AND DRAGLINES 3½ YDS. AND UP

Northwest model 25; 6; 80D; 95. Manitowoc 3500; 4500 new — will rent. Bucyrus 54-B; Monighan 5W; 7W; 9W; 450.

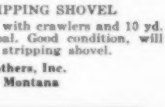
A. W. Nevers Phone 32 Mt. Pleasant, Iowa

ELECTRIC STRIPPING SHOVEL

Bucyrus 200-B equipped with crawlers and 10 yd. dipper for loading coal. Good condition, will make excellent 5 yd. stripping shovel.

Foley Brothers, Inc.
Colstrip, Montana

SMALL SHOVELS, CRANES AND DRAGLINES UP TO 2½ YDS.



1—1¼ cu. yd. Osgood crane and backhoe — new General Motors diesel motor.
1—Model 255-A P&H, ¾ yd. dragshovel and clamshell with gas engine. Excellent condition, approximately one year old.
1—Osgood model 200 ½ yd. shovel and crane gasoline engine, eight years old.
1—Osgood model 200 shovel and crane and backhoe with Chrysler engine, approximately three years old.
Backhoe with two buckets available for either above machines.
1—Model 255 P&H ¾ yd. dragshovel, crane, and dragline, approximately 10 years old.

Stuart M. Christhilf & Company, Inc.
134-136 West Mt. Royal Ave. Baltimore 1, Md.

BUCYRUS-ERIE 15-B, year 1946, diesel powered combination dragshovel, crane and dragline, crane boom 35', fairleads and one-half yard Page dragline bucket. GMC 2½ ton truck and 20-ton Low-boy trailer. This equipment in excellent condition. Located Milwaukee.

Ira C. Jordan
2508 E. Belleview Pl. Milwaukee 11, Wis.

P&H model 700 dragline, serial No. 3747 powered with Atlas Imperial diesel engine. Machine has standard track assembly, 60 foot boom, and is rated at 1¼ yard capacity. Entire machine in good operating condition. Excellent for yard crane or clam shell re-handling work. Price $7500 FOB cars New Mexico. Box 3317

For Sale

2-yard Bucyrus-Erie 44-B Shovel, 1942 Model

For details write Box 3299 c/o Excavating Engineer.

P&H model 165 1-½ yd. shovel 6 months old. Cat. D-13000 engine used 411 hours. Original cost $3600 but will sacrifice for quick sale.

R-B Construction Company
3124 W. Loomis Rd. Milwaukee, Wisconsin
Tel. Evergreen 3-2078

MISCELLANEOUS EQUIPT.

"TIRES" 20 x 1700. $68. With tube. UNUSED. Weight: 172 pounds. Airplane Tire Company, Box 1201-P, Tulare 2, California.

Bucyrus-Erie 10-B shovel, dragline, and clamshell in good condition.
D-4 Caterpillar with Trackson high lift.
4 International 6x6 dump trucks with 16-ton hoists. Low mileage, excellent shape.

R. W. COLLINS CO.
5740 W. 65th St. Chicago, Ill.

One Lorain 40 cable crowd shovel front complete with boom, stick and ⅝ cubic yard bucket. Priced right for quick sale. Box 3321

1—Cedarapids unitized crushing plant.
1—Bucyrus-Erie 120-B steam shovel, 5 yard.
2—Bucyrus-Erie 50-B steam shovels, 1⅜ yard.
1—General Motors Twin power diesel unit, model 12103.
2—Allis-Chalmers synchronous motors, 150 hp, 360 R.P.M.
Telephone or write — MUrray Hill 9-8500.

New York Trap Rock Corporation
230 Park Avenue New York 17, New York

BARGAINS
In Used Construction Equipment

TRACTOR AND DOZER, "CATERPILLAR" D7, 4T-series. 2300 hours on hour meter. LeTourneau bulldozer and double drum power control unit. Reconditioned here in our shop. Shop repair order available for customer's inspection. $10,500.

TRAXCAVATOR, "CATERPILLAR" D4, equipped with 1-yd., 73-in. bucket. Reconditioned and ready to go. $5,250.

MIXER, JAEGER, 1-bag, non-tilt; with power loader; mounted 2 pneumatic tires. A real bargain at $585.

PUMP, JAEGER, centrifugal, model 4 XP, Serial No. P8396, 30M G.P.H. Complete $395.

AIR COMPRESSOR, INGERSOLL-RAND, on skids, suitable for truck or trailer mounting; 55 cu. ft., air cooled with 4-cyl. engine. Late type. Good condition. $450.

Write—F. L. Bennett, 800 West Main Street, Louisville, Kentucky for details and complete used equipment catalog.

Roy C. Whayne Supply Company
Evansville, Ind. Louisville, Ky. Paducah, Ky.

MECHANICS — HOME STUDY. Step up your own skill with facts and figures of your trade. Audels Mechanics Guides contain Practical Inside Trade Information in handy form. Fully illustrated. Easy to Understand. Highly endorsed. Check book you want for 7 days' Free Examination. Send no money. Nothing to pay postman. ☐ Carpentry $6, ☐ Auto $4, ☐ Oil Burners $1, ☐ Sheet Metal $1, ☐ Welding $1, ☐ Refrigeration $4, ☐ Plumbing $6, ☐ Masonry $6, ☐ Painting $2, ☐ Radio $4, ☐ Electricity $4, ☐ Mathematics $2, ☐ Steam Engineers $4, ☐ Machinist $4, ☐ Blueprint $2, ☐ Diesel $2, ☐ Drawing $2. If satisfied you pay only $1 a month until price is paid.

AUDEL Publishers
49 W. 23 St. New York 10, N. Y.

50% OFF

Unused Hendrix Dragline Parts

Sheaves — Pins — Teeth Lips — Chains, etc., for all size buckets.

Write for complete list.

Address:

Excavating Engineer, Box 3318

Dragline front end for Bucyrus-Erie 120-B (Machine No. 12016). Includes 100' boom, fairleads, drum, pedestal, bands, etc., and 4-yd. Page bucket. Box 3320

10-B Bucyrus-Erie shovel — dragline with trailer. Good operating condition.
70 Buckeye gas backhoe. Spare parts. Excellent condition.
D7 Caterpillar tractor and dozer. 4T series. Good shape.
HD-11C Allis-Chalmers tractor and angle blade. Excellent condition.
D-4 Caterpillar tractor and dozer. A good buy. All located in the Southeast. Box 3323

Bucyrus-Erie No. 8 bit dresser. Complete and in perfect operating condition. Located in Washington State. Box 3271

New Dragline Buckets

2-¼ cubic yard Red Arch, Type AX medium duty bucket.
3 cubic yard Red Arch, Type AY heavy duty bucket.
5 cubic yard Red Arch, Type AY heavy duty bucket.
6 cubic yard Red Arch, Type AY heavy duty bucket.

Bucyrus-Erie Company
Parts Division
South Milwaukee, Wisconsin

Owner's Offering
(Subject to Prior Sale)

Located at St. Paul, Minnesota
1—52-B Bucyrus-Erie diesel crane-dragline-shovel combination, including est. $4000 worth of new and used spare parts. Where is, as is. $19,000
1—Robins Gyrex 4'x10' double-deck vibrating screen, ser. GD-6514. Completely overhauled. As is, f.o.b. cars. $1750
1—LeRoi 6-cyl. model M-RX-1S gasoline power unit, 160 H.P., ser. 103998, elect. starter. Excellent condition. As is, f.o.b. cars. $2500
1—Model 50 Caterpillar tractor, diesel, with 10' cable-operated bulldozer. Ser. 1E81. As is, f.o.b. cars, including all spare parts on hand. $2500

Located at St. Cloud, Minnesota
1—14" Superior McCully gyratory crusher, ser. 8467. As is, where is, including all spare parts on hand. $3000
1—10" Superior McCully gyratory crusher, ser. 8090. As is, where is, including new spare breaker head. $2500

J. L. SHIELY COMPANY
1101 N. Snelling Ave. St. Paul 4, Minn.

Continued on page 64

WANTED

Continued from page 63

Wanted: Bucyrus 42-B steam crane, or shovel.
H. Y. Smith Co.
628 N. Broadway Milwaukee 2, Wisconsin

Wanted: 30, 40 or 50-ton locomotive crane.
Box 3318

Wanted: Complete chain crowd shovel front end equipment for Bucyrus-Erie 32-B dragline.
Box 3319

Wanted: Only Koehring model 604 crane or dragline with or without shovel or pullshovel attachment. Write to Willy Boutin, 3281 Mont-Joli St., Montreal, North P. Q. Canada.

POSITION WANTED

Position wanted as shovel operator. Can operate any make of machine; shovel; dragline; clamshell, or crane. Steam, gas, diesel or electric. Large or small machines. Box 3312

Notes from the manufacturers

Blaw-Knox Co., Pittsburgh, Pa., and a subsidiary, the Foote Co., Nunda, N. Y., announce the appointment of four new distributors to furnish sales and service facilities and complete stocks of replacement parts. Le Roi-Rix Machinery Co., 6403 E. Slauson Ave., Los Angeles, Calif., has been appointed distributor in southern California and southern Nevada. The entire state of Idaho, eastern Washington and southeastern Oregon will be served by the Western Equipment Co., P. O. Box 1456, 4009 Fairview Ave., Boise, Idaho, and by Western branches at P. O. Box 96, Idaho Falls, Idaho, and at P. O. Box 2196, Spokane, Wash. New distributor for northeastern New York is R. B. Wing & Son Corp., 384-386 Broadway, Albany, N. Y.; for the province of Quebec and eastern Ontario, Canada, Laurion Equipment Ltd., 1801 St. Patrick St., Montreal, Quebec. The four distributors will handle the complete Blaw-Knox-Foote line of construction equipment. Blaw-Knox Co. also announces the appointment of H. C. Peters as technical consultant of construction equipment of the Blaw-Knox division, with offices in Pittsburgh. He will assist distributors and customers in technical sales service and in product improvement and development.

Walden W. Paape, domestic sales manager of the Euclid Road Machinery Co., Cleveland, Ohio, died suddenly at his home in Willoughby, Ohio, on March 18. He was 48.

Born in Lake Forest, Ill., and an engineering graduate of the University of Illinois, Mr. Paape has been associated with the construction industry for the past 25 years. He joined Euclid in January, 1945, as district manager, coming from the Syracuse Supply Co., where he had been sales manager. In 1947 he was given the position he held at the time of his death. Previous to his association with Euclid, Mr. Paape served in executive sales capacities for LaPlant-Choate Mfg. Co. and Caterpillar Tractor Co. For 10 years prior to these positions he was an engineer for the Peoria Park Board.

Marion Metal Products Co., Marion, Ohio, has anounced that W. H. Hammond has been elected vice-president in charge of sales. He will supervise all domestic and export sales activities.

International Harvester Co., Chicago 1, Ill., now has available embossed metal watch fobs for tractor operators. One has a miniature of the TD-24; the other, an "I.H." in color on a metal field. They are available through International Harvester dealers and Industrial Power distributors. International also announces three new executive assignments in the sales staff of the Industrial Power division. W. M. Holland assistant division sales manager has been placed in charge of engine sales. He succeeds W. M. Parrish who retired March 1. I. P. Payne, formerly manager of industrial power sales for the Southwest region has been made assistant division sales manager, assuming charge of distributor accounts. H. R. Carlson, assistant manager in charge of industrial power sales for the Dallas General Line and Industrial district, succeeds Payne. Carlson's district includes all of Texas and Oklahoma, most of Arkansas, Kansas and Missouri, and sections of Louisiana and New Mexico.

DREDGES

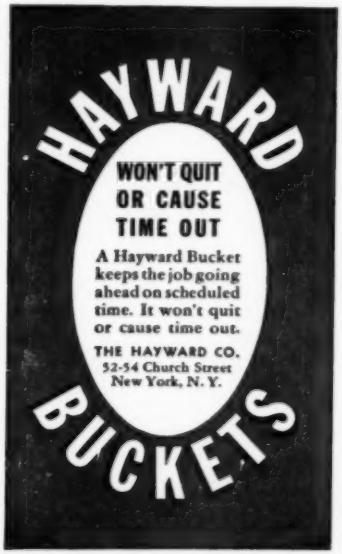
HYDRAULIC
DIPPER
CLAMSHELL

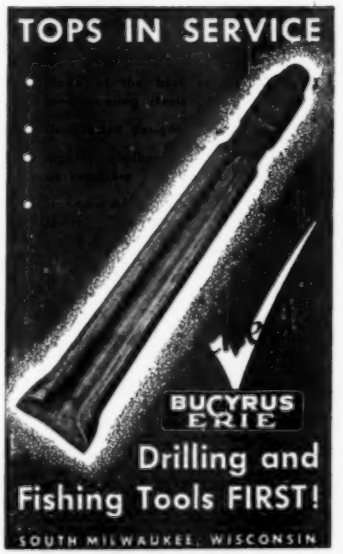
Bolted sectional steel hulls for landlocked, inland waters

If you need a dredge, write us!

AMERICAN STEEL DREDGE CO. INC.
FORT WAYNE 1 - INDIANA - U.S.A.

DESIGNERS AND BUILDERS OF DREDGING EQUIPMENT SINCE 1905

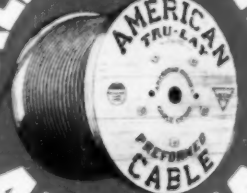

HAYWARD
WON'T QUIT OR CAUSE TIME OUT
A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.
THE HAYWARD CO.
52-54 Church Street
New York, N. Y.
BUCKETS

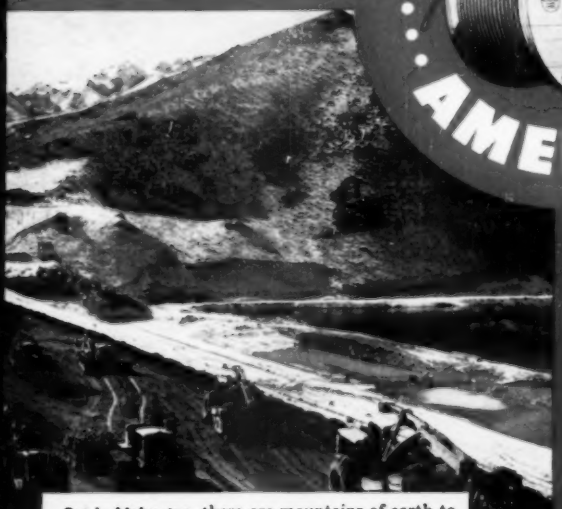


In Southern Illinois strip mining is big business. The shovels and draglines that remove overburden are big, too. TRU-LAY Preformed in large sizes has excellent qualities that make it a favorite for strip mining.

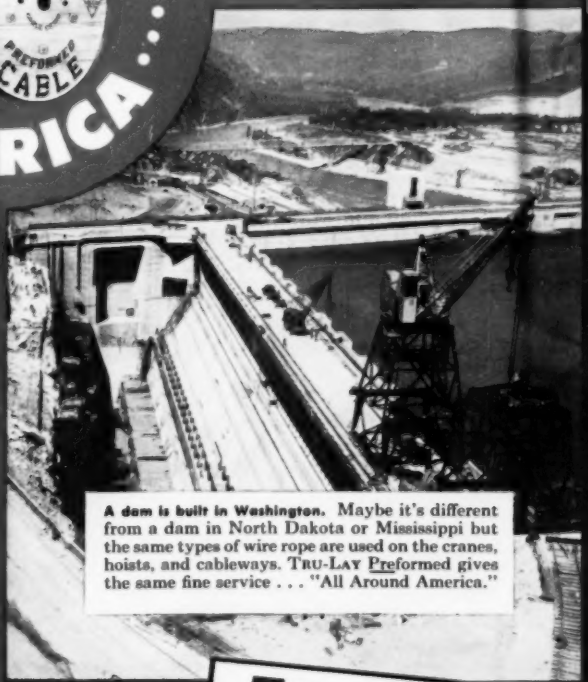
At Detroit a portal crane straddles gondola cars and loads them with foundry sand from storage piles. TRU-LAY Preformed is made in a construction designed for longer service under such abrasive conditions.

ALL AROUND AMERICA





Out in Idaho, too, there are mountains of earth to be moved. Rooters, bulldozers, carrier scrapers, draglines and wagons are used. TRU-LAY Preformed Flattened Strand lasts longer under this gruelling service. It costs less to use.



A dam is built in Washington. Maybe it's different from a dam in North Dakota or Mississippi but the same types of wire rope are used on the cranes, hoists, and cableways. TRU-LAY Preformed gives the same fine service . . . "All Around America."

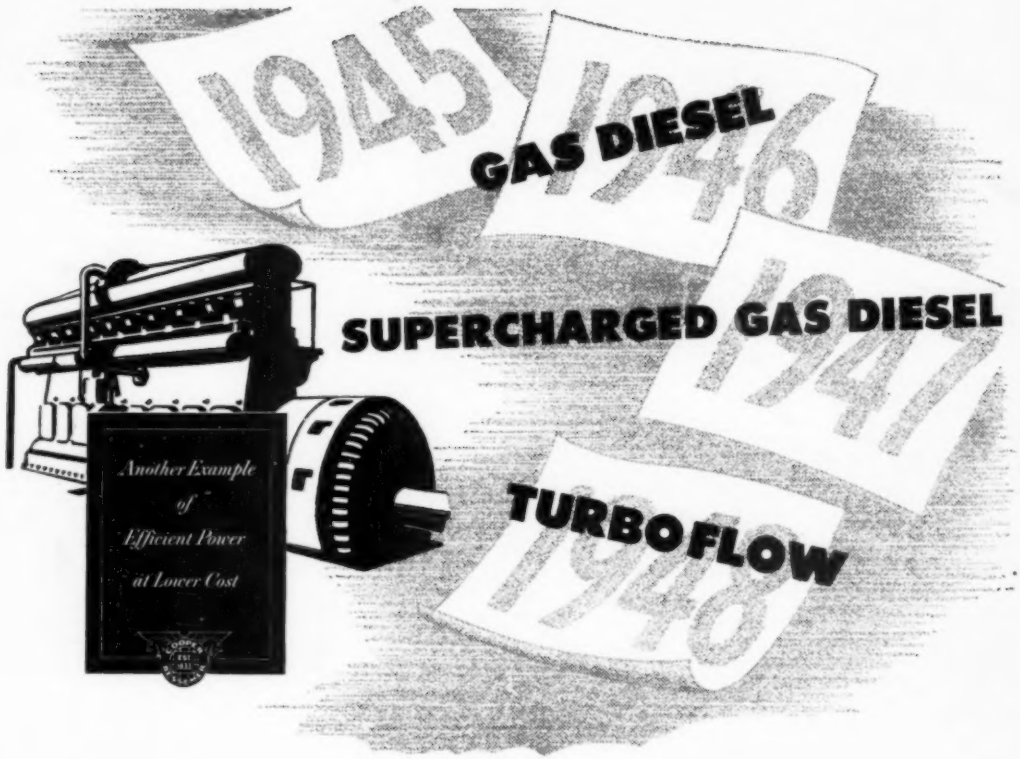
ACCO

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Las Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Seattle, Tacoma, Bridgeport, Conn.

AMERICAN CABLE DIVISION
AMERICAN CHAIN & CABLE

In Business for Your Safety

Tru-Lay *Preformed* **Wire Rope**



If you have a stake in stationary power

you should know about these Cooper-Bessemer developments

DURING the past four years, Cooper-Bessemer has introduced three engine developments of major importance to all users and producers of heavy-duty stationary power . . .

The Gas-Diesel Engine . . . Offers the big advantage of using low-cost gas fuel *at full diesel efficency!* Also, ability to operate on almost any combination of gas and oil or 100% oil fuel makes these engines ideal *wherever gas supply is subject to variation or interruption.* Moreover, a recent refinement gives Cooper-Bessemer gas-diesels record-breaking fuel economy even at *fractional* loads.

Supercharged Gas-Diesel Engine . . . Affords still greater fuel economy and up to 50% more power output for a given engine size or displacement. Power needs may be met with fewer or smaller engines, requiring less initial investment and affording huge savings in the cost of installation, housing, maintenance and operation.

Turboflow Engine . . . A new principle of operation for gas engines, now applied to Cooper-Bessemers. Compared with ordinary gas engines, there is as much as 20% saving in fuel and up to 15% greater power output.

Detailed information on any of these major developments is available to you on request. If you want to know how you can cut your power costs year in, year out, find out about these and the other *new* things being done by one of America's *oldest* engine builders.

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